ENVIRONMENTAL IMPACT ASSESSMENT PROCESS: PROPOSED VENETIA DIAMOND MINE INDEPENDENT POWER PRODUCER PROJECT, LIMPOPO PROVINCE
SCOPING REPORT FOR PUBLIC REVIEW
NOVEMBER 2021

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NON-TECHNICAL SUMMARY

De Beers Venetia Mine (hereto referred to as De Beers) proposes the development of a Photovoltaic (PV) solar energy facility (SEF) to reduce its consumption of grid-supplied power by using solar power. The solar energy facility will be run by a third-party power producer, which will be contracted through a Special Purpose Vehicle (SPV), set up by De Beers.

Zutari (Pty) Ltd has been appointed as the environmental assessment practitioner (EAP) to conduct the environmental impact assessment (EIA) process for this project. The SPV is the applicant, applying for environmental authorisation (EA) from the Limpopo Department of Economic Development, Environment and Tourism (LEDET), who is the environmental competent authority (CA).

Since the project proposal is for the development of a PV facility (i.e. the generation of electricity from a renewable resource) and the capacity will be more than 20 Megawatts (MW), it is considered a "listed activity" in terms of the NEMA 2014 EIA Regulations (GN No. R 982 to 985 of 2014). As such, a Scoping and EIA process is required in accordance with these Regulations.

The EIA process typically follows three distinct phases, namely the Application Phase, the Scoping Phase and the environmental impact report (EIR) Phase, with two stages of public participation (associated with the Scoping and EIR phases, respectively), followed by decision-making and implementation. This report is the Scoping Report, which will be made available for public review to all interested and/or affected parties (I&APs) for comment.

SUMMARY OF SITE LOCATION AND EXTENT:
The Venetia Diamond Mine is situated approximately 80 km west of Musina and 36km north east of Alldays in the Limpopo Province. The SEF and associated infrastructure are proposed to be developed on the preferred site situated on the Remainder of Portion 0 of the Farm Drumsheugh 99 MS farm (referred to as the southern parcel) with an alternative, namely Portion 0 of the Farm Regina 68 MS (referred to as the northern parcel, or Site 2). Site 2 also transects small portions of farms Endora 66 MS and Halcyon 69 MS. Both sites have proposed transmission line corridors, which may affect additional farm portions, between the SEF and substations close to Venetia Mine.

Typical PV facility components will include:

- An SEF, comprising of numerous rows of PV modules mounted on steel tracking mounts and footings (concrete or driven into the ground) with associated support infrastructure, including inverters;
- Internal access roads for servicing and maintenance of the site;
- Temporary equipment laydown areas for use during construction;
- Buildings, including a substation building, operation and maintenance building, guard cabin;
- Weather stations within the fenced perimeter of the site;
- Perimeter fencing;
- Substation and/or switchyard located at the solar farm, to convert the power from solar farm medium voltage to high voltage for transmission;
- Overhead transmission line/s, to transmit power from the solar farm to the mine (described in more detail below);
- Expansion to the existing substation and/or switchyard located at the mine, to convert the power from transmission voltage to mine voltage (11 kV or 132 kV);
- Battery energy storage systems, using non-hazardous lithium ion battery technology; and
- A borehole.

Two overhead transmission lines up to 132 kV are required to transmit the generated power from the SEF to the mine. Two transmission line corridors for each alternative were identified. Each corridor is 200m wide to ensure that it is sufficient for the final micro-siting of the pylons to navigate topography and identified environmental constraints. Furthermore, these corridors will also be informed by the specialist assessment findings during the EIA phase. Therefore, it is currently requested that two 200m wide corridors be approved together with the approved site.

In summary, the following alternatives have been considered in this Scoping Report. The alternatives highlighted in **bold** text are considered preferred and will be taken forward into the next phase of the EIA process, with detailed impact assessments to be conducted by the specialists for these preferred alternatives.

Alternative Type	Description
Location (site) alternatives	▶ Drumsheugh (preferred site) ▶ Regina (alternative site)
Layout alternatives	Layout alternatives for the preferred site will be explored in the EIA phase once the facility design of the preferred bidder is known. Site-specific layout alternatives will be explored to reduce the impacts on sensitive zones defined by specialist studies in the EIA phase.
Technology alternatives	Mounting alternatives: ▶ Fixed tilt ▶ Single axis tracking ▶ Dual axis tracking
Routing alternatives for powerlines	▶ 2 x 200m corridors from Drumsheugh to Venetia Mine (preferred) ▶ 2 x 200m corridors from Regina to Venetia Mine (alternative) Routing alternatives within proposed 200m powerline corridors for the preferred site will be considered in the EIA phase based on specialist field assessments and identification of sensitivities and their buffer zones within these corridors.
The No-Go alternatives	▶ Solar energy generation via the proposed PV facility ▶ "No-go" alternative to solar energy production (no solar PV project)

POTENTIAL ENVIRONMENTAL IMPACTS:
During the screening process, the appointed specialists conducted preliminary site investigations. Various potential impacts on the biophysical and socio-economic environment were identified by the specialists and the EAP, namely:

- Impact on mitigating climate change (positive);
- Impact on terrestrial biodiversity, including animals (birds and bats) and plants (negative);
- Impact on aquatic biodiversity (negative);
- Impact on heritage resources, including archaeological and palaeontological (fossil) resources (negative);
- Impact on the social environment, including expectations for local employment and procurement and socio-economic development (negative and positive);
- Air quality (dust) impacts during construction (negative);
- Traffic impacts during construction (negative);
- Noise impacts during construction (negative); and

- Visual impacts during construction and operation (negative).

Specialist desktop assessments of the below listed assessments were compiled . These specialist reports and associated CVs are included in Annexure E.

Potential Impact	Assessment	Specialist
Impact on fauna (including avifauna), bats, flora, and aquatic systems	Faunal Impact Assessment	Greenthorn Consulting
Impact on heritage resources	Heritage Impact Assessment	Millennium Heritage Group
Social impacts	Qualitative Social Impact Assessment in Scoping Report	Equispectives Research and Consulting Services
Storage of hazardous substances on site	Qualitative Contamination Impact Assessment in Scoping Report	Zutari - EAP
Noise pollution	Qualitative Noise Assessment in Scoping Report	DB Acoustic Consulting
Dust / Air quality	Qualitative Dust Assessment in Scoping Report	Levego
Visual / Landscape	Visual Impact Assessment	Create Landscape Architecture

These impacts on the biophysical and socio-economic environment will be assessed, in terms of the requirements of Annexure 2 of the EIA Regulations, 2014, and according to the Zutari Impact Assessment Methodology contained in Annexure F of the SR. For each impact assessed, mitigation measures will be proposed to reduce and/ or avoid negative impacts and enhance positive impacts. These mitigation measures will be incorporated into the environmental management programme (EMPr) during the EIA Phase to ensure that they are implemented during the planning, construction, operational and decommissioning phases of the proposed project. The EMPr would become a legally binding document should this project receive environmental authorisation.

PUBLIC PARTICIPATION:
A 30-day commenting period will run from 12 November 2021 to 12 December 2021. Consultation with the public forms an integral component of this investigation and enables I&APs (e.g. directly affected landowners, communities, national-, provincial- and local authorities, environmental groups, civic associations, etc.), to identify their issues and concerns relating to the proposed activities. The public participation process (PPP) allows I&APs an opportunity to obtain information about the proposed project, to provide input through the review of documents/reports, and to voice issues of concern on the proposed project at various stages throughout the EIA process. Zutari will respond to the issues and concerns that are raised.

PERTINENT INFORMATIONTO THIS APPLICATION

No.	Project aspect	Description
1	Description of the activity	De Beers Venetia Diamond Mine proposes to construct an alternating current photovoltaic (PV) Solar Energy Facility (SEF), for their Venetia Diamond Mine in the Musina region of Limpopo Province. The proposed PV facility would consist of the following main components: 1. An SEF, comprising of numerous rows of PV modules mounted on steel tracking mounts and footings (concrete or driven into the ground) with associated support infrastructure, including inverters; 2. Internal access roads for servicing and maintenance of the site; 3. A temporary equipment laydown area / construction yard; 4. Buildings, including a substation building, operation and maintenance building, and guard cabin; 5. Weather stations within the fenced perimeter of the site; 6. Perimeter fencing with intrusion protection; 7. Substation and/or switchyard located at the solar farm, to convert the power from solar farm medium voltage to high voltage for transmission; 8. Overhead transmission line/s, to transmit power from the solar farm to the mine (described in more detail below); 9. Expansion to the existing substation and/or switchyard located at the mine, to convert the power from transmission voltage to mine voltage (11 kV or 132 kV); 10. A Lithium-ion based Battery Energy Storage System (BESS); and 11. A borehole(s). There is an existing substation and/or switchyard located at the mine, to convert the power from transmission voltage to mine voltage (11 kV), that does not form part of the application.
2	Municipality	Musina Local Municipality; Vhembe District Municipality.
3	Applicant	Venetia Solar Project (Pty) Ltd.
4	SEF property details (preferred site)	Farm Drumsheugh 99 MS (Remainder of Portion 0)
	Transmission line property details (preferred site)	Farm Drumsheugh 99 MS (Remainder of Portion 0) Farm Venetia 103 MS (Portions 0, 1, 3 and 4)
	SEF property details (alternative site)	Farm Regina 68 MS (Portion 0) Farm Endora 66 MS (Portion 0 and 1) Farm Halcyon 69 MS (Portion 0)

No.	Project aspect	Description
	Transmission line property details (alternative site)	Farm Elesger 98 MS Farm Icon 95 MS Farm Venetia 103 MS (Portion 2 and 5) Farm Drumsheugh 99 MS (Portion 0)
5	Size of the site	Approximately 347 ha
6	Development footprint	Estimated maximum 216 ha
7	Type of technology	A renewable energy facility comprising of numerous rows of single axis tracking PV modules with associated support infrastructure.
8	Structure heights	• Solar PV panels: ≤ 2.5 m height • On-site substation ≤ 10 m in height • Operation and maintenance building: ≤ 5 m in height • Weather stations: ≤ 4 m in height • On-site transmission line/s approximately 21 m above ground level
9	Power line/s (e.g. number of overhead power line/s required, route/s, voltage, height, servitude width, etc.)	powerline servitude carrying overhead powerlines up to 132 kV.

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KAKARETŠO YA THIKINIKHALE

De Beers Venetia Mine (e tlo bitšwa ka De Beers) e šišinya tšwetšopele ya dimekapaete (MW) tše Photovoltaic (PV) lefelo la maatla a solar gore e kgone go fokotša tšhomišo y akiriti ya go fehla mohlagase ka go hwetša maatla a solar yeo e fehlwago mo gae. Lefelo la maatla a solar le tla sepediša ke mokgahlo wa boraro woo e tšweletšang mohlagase, wona o tla thwalwa ka mokgwa wa Special Purpose Vehicle (SPV), wo o o theilwego ke De Beers.

Zutari (Pty) Ltd e thwetšwe bjalo ka mošomi wa tekolo ya tikologo (EAP) go ka lekola tekanyetšo ya tšhušumetšo ya tikologo (EIA) go porotšeke ya SPV (Venetia Solar Project (Pty) Ltd) ke mokgopedi, yoo o kgopelaga tumelelo ya tša tikologo (EA) go tšwa go kgoro ya Tlhabolo ya Ekonomi ya Limpopo, Tikologo le Boeti (LEDET) yoo a nago le maatla a tumelelo a semolao (CA).

Ka ge Tšhišonyo ya porotšeke ye e le ya tšwetšopele ya lefelo la PV (bjk.Go fehla ga mohlagase go tšwa go didirišwa tša go šomišwagape) bogolo bja gona bo tla feta dimakapaete (MW) tše 20, e tsebja bjalo ka "Mešomo yeo e filwego" go ya le ka molao wa NEMA 2014 EIA Melawana (GN No. R 982 go 985 wa 2014). Ka gona, mokgwatshepetšo wa Scoping le EIA o wa hlokega go ya le ka melawana ye.

Mokgwathepetšo wa EIA gantši o latela magato a mararo, ona ke Legato la go dira dikgopelo, Legato la Diphatišišo le pego ya ditlamorago tša tikologo, le magato a mabedi a kgathotema ya setšhaba (e sepelelana le Diphatišišo le kgato ya EIR, gabotse), e latelwa ke go tšea sephetho le go dirwa. Pego ye ke pego ya diphatišišo yeo e tla bago gona gore setšhaba se lekodišiše go bao ba nago le kgahlego/ goba bao ba amegago (I&APs) go ka fa mono wa bona.

KAKARETŠO YA LEFELO LA POROTŠEKE LE GO FETA :

Lefelo la maatla a solar ya PV le meago ya go sepelelana le ona a šišinywa go tlo beiwa lefelong leo le kgethilwego le lego *Remainder of Portion* 0 Polaseng ya Drumsheugh 99 MS farm (yeo e bitšwago southern parcel) gona yengwe e 1 ya go bitšwa *Portion 0* ya Polase ya Regina 68 MS (Yeo e bitšwago northern parcel, goba lefelo le lengwe la bo 2). Lefelo la 2 le na le dikarolwana tše nnyane tša dipolase tša Endora 66 MS le Halcyon 69 MS. Bobedi bja mafelo ana le tšhišinyo ya lethale la dikhorido go tloga lefeloporotšekeng go fihla go lefelo leo le šišinywago ka gare ga Moepo wa Venetia tšeo di ka amago dikarolo tše dingwe tša polase.

Lefelo la go tlwaelega la PV le tlo ba le dilo tša go akaretša:

- Polase ya solar, e na le methaladi ye mentši ya dimotšolo tša PV e momeditšwe godimo ga tšhipi ya go ba le *tracking mounts and footings* (konkoriti goba e epetšwe fase) ka diago tše dingwe tša go ithekga, e akaretša dienebeta;
- Go hwetša ditsela tša ka gare go aba ditirelo le tlhokomelo ya lefeloporotšeke.;
- Didirišwa tša lebakanyana tša lefelo la fase la tšeo di tlilego go šomišwa nakong ya khonseterakešene;
- Meago, e akaretša moago wa go hlomasetša, moago wa taolo, le wa boletadikgoro;
- Seteišene sa maemoboso ka gare ga lefeloporotšeke yeo e dikaneditšwego;
- Fense ya pheremetha;
- Substation le/goba switchyard yeo e lego kgauswi le polase, go fetolela mohlagase go tloga go voltage ya solar ya polaseng go ya go phetolo ya voltage;
- Mathala a go fetiša MohlagaseOverhead transmission line/s, go fetisa mohlagase go tloga polaseng ya solar go ya moepong (e hlalositšwe ka botlalo ka mo fase);
- Substation le/goba switchyard yeo e lego moepong, go fetolela mohlaga go tloga go tphetelo ya voltage go ya go voltage (11 kV) ya moepong; le
- Mekgwa ya go boloka maatla a Battery energy, re šomiša dilo tša go hloka kotsi thekenolotši ya lithium battery .

Mathale a mabedi a 132 kV a hlokagala go ka fetišetša mohlagase go tloga go sa PV go ya moepong. Mathale a mabedi a khorido a kgethilwe. Yengwe le yengwe ya khorido e filwe 200m ya bophara go kgonthišiša gore khorindo yeo e dumeletšwego e loketše micro-siting ya pylons go ka lekodiša seswantšhobokagodimo le go laetša tšeo di sa hlokegeng.gape, dikhorindo tše di tla lebelediša ke tekolo ya setsibi nakong ya legato la EIA. Ka gona go kgopelwa gore dikhorindo tše pedi di dumelelwe gammogo le lefeloporotšeke leo le kgethilwego.

POTENTIAL ENVIRONMENTAL IMPACTS:

Nakong ya mokgwatshepetšo ya go lekodišiša kamo ya tša go fapana go biophysical le tikologo ya tša kamano-ekonomi e bontšhitšwe ke ditsibi le EAP, tšona ke:

- Kamo ya tšeo di lego lefase, go akaretša diphoofolo le dimela;
- Kamo go dinonyane;
- Kamo go mafelo menyola;
- Kamo go mafelo a bohwa, go akaretša mohla go bohwa bja tša kgale tša go itlhamelwa le bohwa bja tša kgale tša tlhago;
- Kamo go tikologo ya bohle;
- Kamo wa boleng bja moya;
- Kamo ya lešata; le
- Kamo y ago bona.

Tekolo ya setsi (go ya le ka tafolana ya ka fase) le ketelo ya lefeloporotšeke di dirile go ka hwetša kamo ya tseo di hweditšwego ka gona tšona di laetsa ka karolong ya go latela. Dipego tša ditsibi le maneneophelo a akareditšwe go Annexure E.

Tša go tliša kamo	Tekolo	Setsibi
Kamo ya diphidi (go akaretša dinonyane), dimela, le diphidimeetseng	Tekolo ya Khwanthethifi ya diphidi	Greenthorn Consulting
Kamo ya didrišwa tša bohwa	Tekolo ya Khwanthethifi ya tsa bohwa	Millennium Heritage Group
Kamo ya tša leago	Tekolo ya Khwanthethifi ya kamo ya leago	Equispectives Research and Consulting Services
Poloko ya dididrišwa tše kotsi lefelongporotše	Tekolo ya Khwanthethifi ya tšhilafalo	Zutari - EAP
Tšhilafalo ya lešata	Tekolo ya Khwanthethifi ya lešata	DB Acoustic Consulting
Lerole/ Boleng bja moya	Tekolo ya Khwanthethifi ya lerole	Levego
Go bona /bogodimo bja lefase	Tekolo ya kamo ya go bona ka Desktop	Create landscape architecture

Dikamo tše ka moka tša biophysical le kimono-ekonomi di tlo lekolwa , go ya le ka dinyakwa tša Annexure 2 ya melawana ya EIA , 2014, gape go ya le ka Tekolo ya Mekgwanyakišišo ya kamo ya Zutari yeo e lego ka Annexure F ya SR. Go ya ka tekolo yengwe le yengwe yeo e dirilwego, mekgwa ya go fokotša goba go široga dikamo tše mpe go ka fihlelela kamo ye botse. Mekgwa yeo e tla šomišwa ka lenaneothero la taolo ya tikologo (EMPr) nakong ya legato la EIA go kgonthišiša gore di a phethagatšwa nakong ya go beakanya, khonseterakešene, tshepedišo le go tloša tše dingwe porotšeke yeo e šišinywago . EMPr e tla ba tokomane ya boipofo bja semolao ge porotšeke ye e ka fiwa tumelelo ya tikologo.

KGATHOTEMA YA SETŠHABA:

Mokgwatshepetšo wa moeno wa go tšea karolo ga bakgathatema (PPP) ke go aba tshedimošo go setšhaba , go laetša mathata le dingongorego tše bohlokwa e sale ka pela, go araba mathata le dingongorego tšeo di tšwelelang, go fa monyetla wa go lekodišisa, le go ngwadišwa mokgwatshepetšo gabotse.

Lebaka la matsatši a 30 a tla thoma ka 12 Dibatsela 2021 go fihla ka 12 Manthole 2021. Dipoledišano le setšhaba di dira kgatha tema ye bohlokwa kudu mo nyakišišong gape e kgontšha I&APs (mohl. Baami bja benglefase, setšhaba, naga-, phorofense- le balaodi bja selegae, dihlopha tša tikologo, bošomišane bja setšhaba), go ka ntšha mathata le dingongorego tša go sepelelana le tšeo di šišinywago. PPP e diretšwe go fa I&APs monyetla wa go ka hwetša tsebo ka ga porotšeke yeo e šišinywago, ka go laetša tekolo ya ditokomane/pego, le go bolela se sengwe le se sengwe ka ga magato a tshepetšo ya EIA.

MANWELEDZO A THEKHINIKI

Vha Mugodi wa De Beers Venetia (u divhiwaho sa De Beers) u khou dzinginya u bveledzwa ha Photovoltaic PV ya mudagasi wa solar kha mudagasi u bveledzwaho nga sola. Mudagasi wa solar udo tshimbidzwa nga vhanwe vhabveledzi vha mudagasi vha nnda, une wa do rengwa nga kha Special Purpose Vehicle (SPV), tshine ndi tshiimiswa tsho thomiwaho nga vha De Beers.

Zutari (Pty) Ltd yo tholwa u thathuvha zwi yelanaho na mupo (EAP) uri vha kone u thathuvha masiandaitwa a zwa mupo (EIA) kha thandela iyi. Havha vha SPV (Venetia Solar Project (Pty) Ltd) ndi vhone vho itaho khumbelo, hune vho ita khumbelo yay a thendelo (EA) kha Muhasho wa Mveledziso ya Ikonomi, Mupo na Vhuendelamashango Limpopo (LEDET) vhane ndi vhone vhare na maanda a ndaulo (CA).

Sa vhunga u dzinginywa ha thandela iyi hu ha u bveledzisa tshiimiswa tsha PV (zwine zwavha u bveledzwa ha mudagasi ubva kha zwiko zwi konaho u shumiswaho futhi) nahone maanda awo ado fhira 20 Megawatts (MW), zwi dzhiiwa sa “tshitenwa tsho vhekanywaho” uya nga Milayo ya NEMA 2014 EIR (GN No, R 982 uya kha 985 ya 2014. Nga zwenezwo, hu todea ndila dza Tshivhumbeo na EIA dzi yelanaho na milayo iyi.

Ndila hedzi dza EIA kanzhi dzi tevhedzela zwidida zwiraru zwo fhambanaho, zwine zwa vha Tshipida tsha u ita Khumbelo, Tshipida tsha u nea Tshivhumbeo khathihi na Tshipida tsha muvhigo wa masiandaitwa a zwa mupo (EIR), hune ha dovha havha na zwipida zwivhili zwa u dzhenelela ha vhathu (zwino yelana na Zwipida zwa Tshivhumbeo na EIR), zwa tevhelwa u dzhiiwa ha tsheo na u thoma u shuma. Muvhigo hoyu ndi Muvhigo wa Tshivhumbeo une wa do andadzwa uri vhathu vha u sedzuluse kha vhothe vha ne vha vha na dzangalelo.

MANWELEDZO A FHETHU HUNE HA DO SHUMELWA HONE NA URI HO NO SWIKIWA NGAFHI:
Tshipida tsha mudagasi wa solar tsha PV khathihi na themamveledziso ya hone hu pfala upfi zwi bveledzwa fhethu hukene huno wanala kha Tshipida tsha u Fhedzisela tsha Portion 0 Bulasini ya Drumsheugh 99 MS (ino divhiwa sa phasela ya tshipembe) hune ya vha na tshinwe tshipida tshine tsha nga shumiswa tsha Portion 0 Bulasini ya Regina 68 MS (tshi no vhidzwa phasela ya devhula, kana tshinwe tshipida tshine tsha nga shumiswa tsha 2). Tshipida tsha 2 na tshone tshi fhandekanya zwipida zwa bulasi la Endora 66 MS na ya Halcyon 69 MS khathihi. Fhethu afho hothe vho tahisa uri vha nga Phadaladza dzthale dzavho ubva hanefho uya hune ha dovha na zwititshi zwituku zwire nga ngomu mikanoni ya Mugodi wa Venetia zwine zwa nga kwama zwinwe zwipida zwa bulasini.

Zwipida zwa PV zwo doweleaho zwi do katela:

- Bulasi ya Solar, ine ya dovha ina miduba yo fhambanaho ya PV yo nambatedzwaho kha tsimbi ntha na fhasi (kha semende ya khonkhiriki kana yo dzheniswa fhasi mavuni) hune ha dovha na themamveledziso ya u tikedza, ino katela dzi inverter;
- Bada dza nga ngomu dza u tshimbila musi hu tshi lugiswa na u thogomelwa fhethu afho;
- Tshishumiswa tsha tshifhinganyana tsha fhethu ho waho tshi no do shumiswa musi hu tshi khou fhatiwa;
- Zwifhato,hu tshi katelwa na tshifhato tsha u tumekanya , tshifhato tsha u langula, lufhera lwa vhalindi;
- Zwititshi zwa Mutsho u mona na fhethu hothe ho dzharatelwaho hanefho;
- Fhethu afho ho dzharatelwaho

- Zwititshi zwituku khathihi na/kana hu fungiwaho mudagasi zwi re hanefho bulasini ya solar, u bvisa mudagasi ubva bulasini ya solar uya kha transmission voltage ya; 7
- Thale dza u tshimbidza dzi tshimbilaho muyani, u tshimbidza mudagasi ubva bulasini ya solar uya mugodini (zwo talutshedzwa nga vhudalo hafho fhasi)
- Tshititshi tshituku na/kana hu fungiwaho mudagasi hu re hanefho mugodini, u shandukisa mudagasi ubva kha transmission voltage uya kha voltage dza mugodini.
- Fhethu ha u vhulunga mudagsi wa betiri, hu tshi khou shumiswa thekhinolodzhi ya betiri isi khombo ya lithium

Thale mbili dza u tshimbidza mulilo dza 132 Kv dzi khou todea u tshimbidza mudagasi wo no kuvhanganywaho ubva kha solar PV uya mugodini. Mukwita uno tshimbila thale idzo mbili dza u tshimbidza mudagasi dzi no do thusedza ho topolwa.Mukwita muthihi wo netshedzwa vhudenya ha 200m u itela uri mukwita uyo wo tendelwaho u vhe wo linganela u nga dzhena dzi micro siting dza u fhedzisela dza pylons uri dzi kone u dzhena fhasi na u kona u topola uri hu hani. Tshinwe hafhu, mikwita iyi ido ya na nga zwine vhathathuvhi vha tshipentshala vha do wanulusa kha tshipida tsha EIA. Zwenezwo zwa zwino hu khou humbelwa uri mikwita iyo mivhili ya vhudenya ha 200m I phasisiwe yothe khathihi na fhethu ha u shumela.

MASIANDAITWA ANE ANGA VHANGWA KHA MUPO

Nga tshifhinga tsha musi hu tshi khou thathuvhiwa masiandaitwa ane anga vhangwa kha tshiimo tsha mupo khathihi na tsha matshilisano na ikonomi ya mupozwo vhadivhi na vha EAP vho topola, zwi tevhelaho:

- Masiandaitwa akha zwimela zwa lifhasi, zwi no katela zwikhokhonono na maluvha
- Masiandaitwa a kha zwinoni
- Masiandaitwa kha maroroma
- Masiandaitwa khazwiko zwa vhufa, u fana na divhazwakale ya vhathu na zwipuka na zwimela
- Masiandaitwa kha mupo wa matshilisano
- Masiandaitwa a tshiimo tsha muya
- Masiandaitwa a phosho/mungo; khathihi na
- Masiandaitwa kha zwifanyiso zwi vhonwaho nga mato

U thathuvha nga vhadivhi (sa zwo sumbedzwaho afho fhasi) khathihi na u dalela fhethu afho hune ha khou dou shumelwa hone zwo itwa hu u toda u toda u wana masiandaitwa aya nahone mawanwa a hone o sumbedzwa kha zwipida zwi no khou tevhela. Mivhigo heyi khathihi na dzi CV dzi yelanaho nayo zwo katelwa kha Annexure E.

Masiandaitwa a Lavhelelwaho	Thathuvho	Mudivhi
Masiandaitwa a kha zwipuka (hu tshi katelwa zwinoni), zwimela, khathihi na zwa madini	Thathuvho ya Masiandaitwa kha Zwipuka	Greenthorn Consulting
Masiandaitwa kha zwiko zwa vhufa	Thathuvho ya Masiandaitwa kha Vhufa	Millennium Heritage Group
Masiandaitwa kha matshilisano	Thathuvho yo Dziaho ya Masiandaitwa kha Matshilisano	Equispectives Research and Consulting Services
U vhulungwa ha zwishumiswa zwa khombo hanefho hu no khou shumelwa hone	Thathuvho yo Dziaho ya u Masiandaitwa a u Tshikhafhadzwa	Zutari - EAP
U Tshikhafhadzwa nga phosho	Thathuvho yo Dziaho ya Phosho	DB Acoustic Consulting

Masiandaitwa a Lavhelelwaho	Thathuvho	Mudivhi
Buse / Ndeme ya Muya	Thathuvho yo Dziaho ya Buse	Levego
Zwi vhonalaho / Mavu	Thathuvho ya Masiandaitwa Zwi vhonalaho nga khomphutha	Create landscape architecture

Masiandaitwa haya a zwa matshilisano na ikonomi kha mupo ado thathuvhiwa, uya nga thodea dza Annexure 2 ya Milayo ya EIA, ya 2014, khathihi na uya nga Maitele a u Thathuvha Masiandaitwa a Zutari are kha Annexure F ya SR. Kha u thathuvha masiandaitwa manwe na manwe, maga a u fhungudza o tahiswa u fhungudza khathihi na u tinya masiandaitwa asi avhudi khathihi na u khwathisa masiandaitwa avhudi. Maga haya a u fhungudza ado katelwa kha mbekanyamushumo ya vhalanguli vha zwa mupo (EMPr) nga tshifhinga tsha Tshipida tsha EIA u vhona uri a tevhedzelwa musi hu tshi pulaniwa, u fhata, u shuiwa khathihi na musi hu tshi vho netshedzwa tshifhato musi tsho no fhela kha thandela yeneyo. EMPri dovha linwalo line la vhofha munwe na munwe arali thandela heyi ya nga phasisiwa.

U DZHENELELA HA TSHITSHAVHA

Tshipikwa tshihulwane tsha u dzhenelela (PPP) ndi u netshedza mafhungo kha tshithavha, u topola zwithu zwa ndeme khathihi na khaedu zwi tshe zwinu, u shumana na mafhungo eneo khathihi na mbilahelo dzo tahiswaho, u netshedza tshikhala tsha uri vha sedzuluse, khathihi na uri vha vhekanye maitele zwavhudi.

Tshifhinga tsi linganaho naduvha a 30 ubva duvha la u thomatshi do thoma nga 12 Lara 2021 u swika 12 Nyendavhusiku 2021. Nyambedzano na vhathu zwi vhumba tshipida tsha ndeme tsha thodisiso idzi nahone zwi nea I&Aps (tsumbo, vhane vha mavu vha kwameaho, zwitshavha, ndaulo ya lushaka, mavundu khathihi na ya uvhuso wapo, zwigwada zwi sedzanaho na zwa mupo, madzangano a vhadzulapo), uri vha kone u topola zwi sa vha fariho zwavhudi zwi tshi yelana na mushumo uyu wo tahiswaho. Vha PPP vha a kona u netshedza I&Aps tshikhala tsha u kona u wana inwe ndivho nga ha thandela iyo, u netshedza mihumbulo nga kha u manwalo/mivhigo, khathihi na u amba nga mafhungo othe avha vhilahedzaho kha zwipida zwo fhambanaho zwothe zwa EIA.

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NEMA REQUIREMENTS WITH REFERENCE TO RELEVANT SECTIONS OF THIS REPORT

The Environmental Impact Assessment (EIA) process undertaken to date has culminated in the production of this SR, which provides detailed information relevant to the project.

Table 1 illustrates how the structure of the SR addresses applicable requirements for information in terms of National Environmental Management Act (Act No. 107 of 1998) (NEMA).

Table 1-1 | Environmental Impact Assessment Regulations (GN No. 982 of 2014) requirements for Scoping Reports

Appendix 2	Content as required by NEMA	Section /Annexure
2(a)	(i) Details of the EAP who prepared the report; and	Section 1.3 Annexure A
	(ii) Details of the expertise of the EAP, including a curriculum vitae.	
2 (b)	The location of the activity, including:	Section 3.1
	(i) The 21 digit Surveyor General code of each cadastral land parcel;	
	(ii) Where available, the physical address and farm name;	
	(iii) Where the required information in items (i) and (ii) is not available, the coordinates of the boundary of the property or properties;	N/A
2 (c)	A plan which locates the proposed activity or activities applied for at an appropriate scale, or, if it is-	Section 1 and Annexure J
	(i) A linear activity, a description and coordinates of the corridor in which the proposed activity or activities is to be undertaken; or	Section 3.2.5
	(ii) On land where the property has not been defined, the coordinates within which the activity is to be undertaken;	
2 (d)	A description of the scope of the proposed activity, including:	Section 2.4
	(i) All listed and specified activities triggered;	
	(ii) A description of the activities to be undertaken, including associated structures and infrastructure;	Sections 3
2 (e)	A description of the policy and legislative context within which the development is proposed, including an identification of all legislation, policies, plans, guidelines, spatial tools, municipal development planning frameworks and instruments that are applicable to this activity and are to be considered in the assessment process;	Section 2
2 (f)	A motivation for the need and desirability for the proposed development including the need and desirability of the activity in the context of the preferred location;	Section 3.6
2 (h)	A full description of the process followed to reach the proposed preferred activity, site and location within the site, including:	Section 3.7
	(i) Details of all the alternatives considered;	
	(ii) Details of the public participation process undertaken in terms of regulation 41 of the Regulations, including copies of the supporting documents and inputs;	Section 5
	(iii) A summary of the issues raised by interested and affected parties, and an indication of the manner in which the issues were incorporated, or the reasons for not including them;	To follow in the Scoping Report once public

Appendix 2	Content as required by NEMA	Section /Annexure
		participation has been completed.
	(iv) The environmental attributes associated with the alternatives focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects;	Section 3.7.1
	(v) the impacts and risks identified for each alternative, including the nature, significance, consequence, extent, duration and probability of the impacts, including the degree to which these impacts- (aa) can be reversed; (bb) may cause irreplaceable loss of resources; and (cc) can be avoided, managed or mitigated;	Section 4
	(vi) The methodology used in determining and ranking the nature, significance, consequences, extent, duration and probability of potential environmental impacts and risks associated with the alternatives.	Annexure F
	(vii) Positive and negative impacts that the proposed activity and alternatives will have on the environment and on the community that may be affected focusing on the geographical, physical, biological, social, economic, heritage and cultural aspects	Section 4
	(viii) The possible mitigation measures that could be applied and level of residual risk	Section 4
	(ix) The outcome of the site selection matrix.	Section 3.7
	(x) If no alternatives, including alternative locations for the activity were investigated, the motivation for not considering such	N/A
	(xi) A concluding statement indicating the preferred alternatives, including preferred location of the activity.	Section 3.7.5
2 (i)	A plan of study for undertaking the environmental impact assessment process to be undertaken, including: (i) A description of the alternatives to be considered and assessed within the preferred site, including the option of not proceeding with the activity; (ii) A description of the aspects to be assessed as part of the environmental impact assessment process; (iii) Aspects to be assessed by specialists; (iv) A description of the proposed method of assessing the environmental aspects, including aspects to be assessed by specialists; (v) A description of the proposed method of assessing duration and significance; (vi) An indication of the stages at which the competent authority will be consulted; (vii) Particulars of the public participation process that will be conducted during the environmental impact assessment process; and (viii) A description of the tasks that will be undertaken as part of the environmental impact assessment process; (ix) Identify suitable measures to avoid, reverse, mitigate or manage identified impacts and to determine the extent of the residual risks that need to be managed and monitored.	Annexure G

Appendix 2	Content as required by NEMA	Section /Annexure
2 (j)	An undertaking under oath or affirmation by the EAP in relation to:	Annexure B
	(i) The correctness of the information provided in the report;	
	(ii) The inclusion of comments and inputs from stakeholders and interested and affected parties; and	
	(iii) 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;	
2 (k)	An undertaking under oath or affirmation by the EAP in relation to the level of agreement between the EAP and interested and affected parties on the plan of study for undertaking the environmental impact assessment;	Annexure B
2 (l)	Where applicable, any specific information required by the competent authority; and	The competent authority has not requested any specific information to date.
2 (m)	Any other matter required in terms of section 24(4)(a) and (b) of the Act.	N/A

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ABBREVIATIONS

ac	Alternating current
BID	Background Information Document
BPEO	Best Practicable Environmental Option
CARA	Conservation of Agricultural Resources Act (Act No. 43 of 1983)
CO_2	Carbon dioxide
CRR	Comments and Response Report
dc	Direct current
DEA&DP	Department of Environmental Affairs and Development Planning[1]
DEAT	Department of Environmental Affairs and Tourism (previous name of the DFFE)
DFFE	Department of Fisheries, Forestry and Environment (previous name of DEA and DEFF)
DoE	Department of Energy
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EIS	Ecological Importance and Sensitivity
EMF	Environmental Management Framework
EMPr	Environmental Management Programme
ESA	Early Stone Age
ha	Hectare
HIA	Heritage Impact Assessment
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
IRP	Integrated Resource Plan
kV	kilovolt
LEDET	Limpopo Department of Economic Development, Environment and Tourism
MW	Megawatt
MWac	Megawatt alternating current
NEM: BA	National Environmental Management Biodiversity Act (Act No.10 of 2004)
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NERSA	National Energy Regulator of South Africa
NFEPA	National Freshwater Ecosystem Priority Areas
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999)
NRTA	National Road Traffic Act, 1996 (Act No. 93 of 1996) (as amended)
NWA	National Water Act, 1998 (Act No. 36 of 1998)
PEA	Potentially Economically Active
PES	Present Ecological State
PPP	Public Participation Process
PV	Photovoltaic
SAHRA	South African Heritage Resources Agency
SANRAL	South African National Roads Agency Limited
SDF	Spatial Development Framework
SCC	Species of Conservation Concern
TOPS	Threatened or Protected Species

[1] Although this authority is in the Western Cape, some of their guideline documents (e.g. the guideline on need and desirability in EIAs) is relevant, since it is the only one of its kind on this issue in South Africa.

ToR	Terms of Reference
UNFCCC	United Nations Framework Convention on Climate Change

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1 INTRODUCTION

This section provides a brief overview of the proposed project and the legislated Environmental Impact Assessment (EIA) process to be followed. It also guides the reader as to where certain information may be found within the document and lists the assumptions and limitations that pertain to the compilation of this report.

De Beers Venetia Diamond Mine (hereto referred to as De Beers) proposes the development of a Photovoltaic (PV) solar energy facility (SEF) to reduce its consumption of grid-supplied power by using solar power. The solar energy facility will be run by a third-party power producer, which will be procured through a Special Purpose Vehicle (SPV), Venetia Solar Project (Pty) Ltd, which has been set up by De Beers in parallel to the procurement process. De Beers will commence the long lead-time permitting arrangements through the SPV and will transfer ownership of the SPV to a Preferred Bidder to allow them to continue the project development process. The process of procuring the preferred bidder is currently underway.

The SPV is set-up as an independent, third-party renewable power generation company who will sell electricity to De Beers under a power purchase agreement ("PPA"), and will be responsible for all permitting required for the project, as well as all other contractual and financial arrangements to construct and operation the project ("IPP Structure").

The electricity generated by the proposed PV facility would be consumed mainly by the Venetia Diamond Mine. The mine is situated approximately 80 km west of Musina and 36km north east of Alldays in the Limpopo Province (Figure 1-1). The proposed SEF sites are located within the Venetia Limpopo Nature Reserve (VLNR) - a private nature reserve belonging to and managed by De Beers. Figure 1-1.

The SEF and associated infrastructure are proposed to be developed on the preferred site situated on the Remainder of Portion 0 of the Farm Drumsheugh 99 MS farm (referred to as Site 1). The alternative site (Site 2) is located on Portion 0 of the Farm Regina 68 MS. Site 2 also transects small portions of farms Endora 66 MS and Halcyon 69 MS. Both sites have proposed transmission line corridors, which may affect additional farm portions, between the SEF and the substations at Venetia Mine. Please refer to section 3 for a detailed description of the site location and extent.

The National Environmental Management Act (No. 107 of 1998) (NEMA), and the NEMA Environmental Impact Assessment (EIA) Regulations of Government Notice (GN) No. 982 of 2014, requires an Environmental Authorisation (EA) from the environmental competent authority before the project can proceed. The EIA process is being carried out in terms of the above-mentioned regulations. De Beers appointed Zutari (Pty) Ltd (Zutari) as the independent environmental practitioner (EAP) to undertake the EIA process.

Section 24(C)(1) of NEMA provides that "when listing or specifying activities in terms of section 24(2) the Minister [of Forestry, Fisheries and Environment (DFFE)], or an MEC with the concurrence of the Minister [of DFFE], must identify the competent authority (CA) responsible for granting environmental authorisations in respect of those activities". Each of the Listing Notices to the NEMA EIA Regulations, 2014 ("EIA Regulations") provides that:

"The competent authority in respect of the activities listed in this part of the Notice is the competent authority in the province in which the activity is to be undertaken, unless-

(a) it is an application for an activity contemplated in section 24C(2) of the Act, in which case the competent authority is the Minister or an organ of state with delegated powers in terms of section 42(1) of the Act; or
(b) the listed or specified activity is or is directly related to-
i. prospecting or exploration of a mineral or petroleum resource; or
ii. extraction and primary processing of a mineral or petroleum resource;
in which case the competent authority is the Minister responsible for mineral resources".

Since the proposed SEF will be developed independently by an external independent power producer, and the plant may continue to sell electricity to other users besides the mine after the mine's decommissioning, it is Zutari's opinion that the proposed SEF is not directly related to mining. Furthermore, it should be noted that the Venetia Diamond Mine will be an off-taker of electricity generated by the IPP. Hence, the Minister responsible for mining and minerals is not the competent authority.

(2) The Minister must be identified as the competent authority in terms of subsection (1), unless otherwise agreed to in terms of section 24C(3), if the activity—
(a) has implications for international environmental commitments or relations, and where—
(i) it is identified by the Minister by notice in the Gazette; or
(a) has implications for international environmental commitments or relations, and where—
(i) it is identified by the Minister by notice in the Gazette; or
(ii) it is an activity that takes place in an area protected by means of an international environmental instrument, other than[2] —
(aa) a conservancy;
(bb) a protected natural environment;
(cc) a proclaimed private nature reserve;
(dd) a natural heritage site;
(ee) the buffer zone or transitional area of a biosphere reserve; or
(ff) the buffer zone or transitional area of a world heritage site;

Since the location of the project is in the buffer area of the Mapungubwe Cultural Landscape World Heritage Site, the national DFFE is not the competent authority. Accordingly, the CA for the proposed project has been identified as the provincial Limpopo Department of Economic Development, Environment and Tourism (LEDET).

LEDET's decision will be based on the outcome of this Scoping and EIR process to follow:

This Scoping Report is structured as follows:

Section 1	Introduces the EIA process, notes the assumptions, uncertainties and limitations, and confirms the independence of the Environmental Assessment Practitioner (EAP)
Section 2	Describes the legislation and policy framework for the EIA process, as well as the listed activities
Section 3	Describes the proposed project and the identified alternatives. In addition, it also provides a motivation of the need for the proposed Venetia Mine Solar Power PV facility.

[2] Zutari's underlining.

Section 4	Provides a description of the environment and an initial assessment of the potentially significant environmental and social impacts associated with the project, as a basis for the determination of the detailed specialist studies required to support the EIR phase of the project. It also provides an initial assessment of mitigation measures to reduce negative impacts and enhance positive impacts.
Section 5	Describes the Public Participation Process (PPP) that has been conducted to date, and that will be undertaken during the remainder of the process.
Section 6	This section provides recommendations and concludes the report. It also briefly touches on a few key procedural aspects going forward.

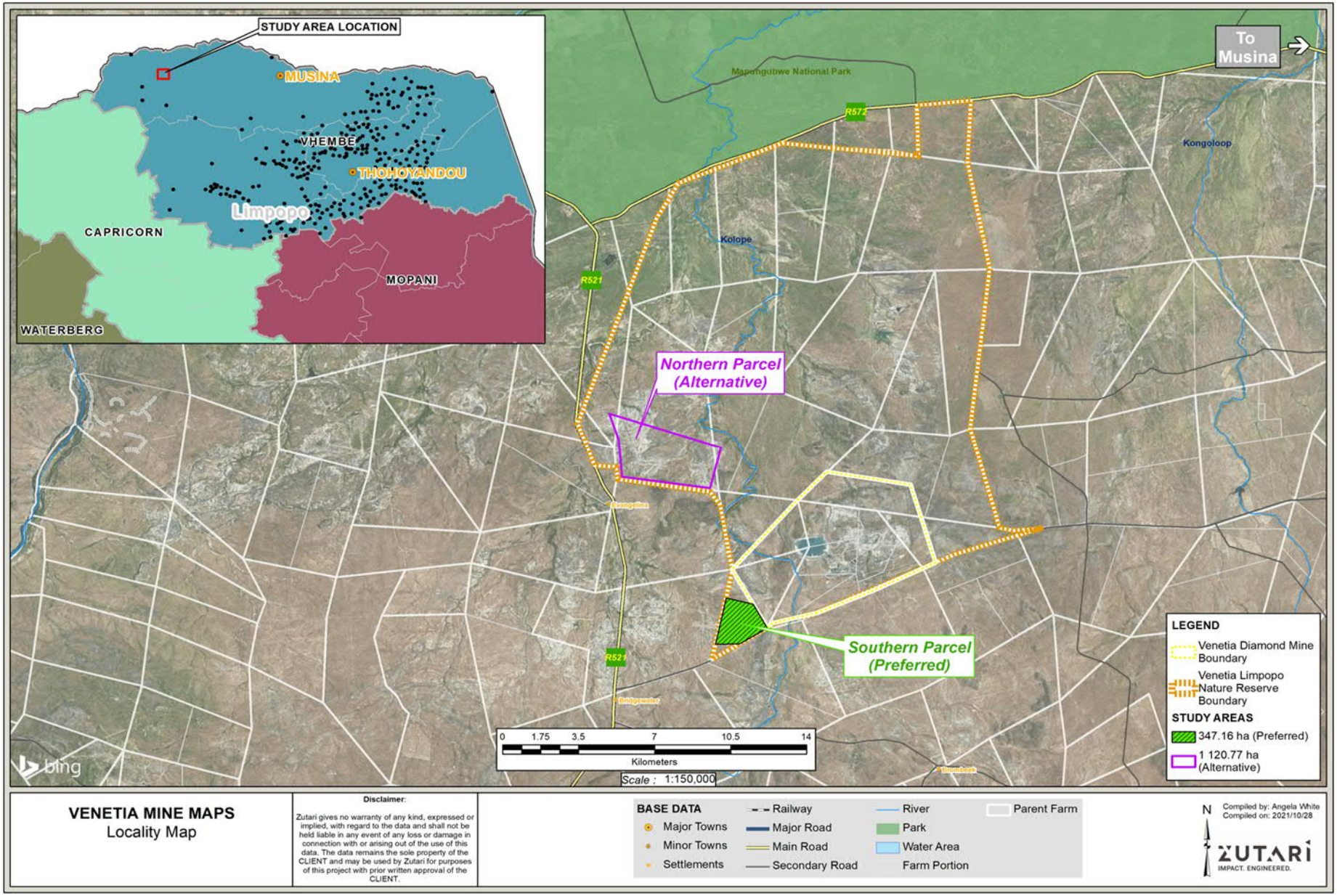


Figure 1-1| Locality map of the proposed alternative sites for the Venetia Diamond Mine PV Solar Energy Facility

1.1 EIA PROCESS AND APPROACH

Since the project proposal is for the development of an SEF (i.e. the generation of electricity from a renewable resource) and the capacity will be more than 20 Megawatts (MW), it is considered a "listed activity" in terms of the NEMA 2014 EIA Regulations (GN No. R 982 to 985 of 2014). As such, a Scoping and Environmental Impact Report (EIR) process is required in accordance with these Regulations.

The EIA process typically follows three distinct phases, namely the Application Phase, the Scoping Phase and the EIR Phase, with two stages of public participation (associated with the Scoping and EIR phases), followed by decision-making and implementation. Figure 1-2 illustrates the regulatory process to be followed.

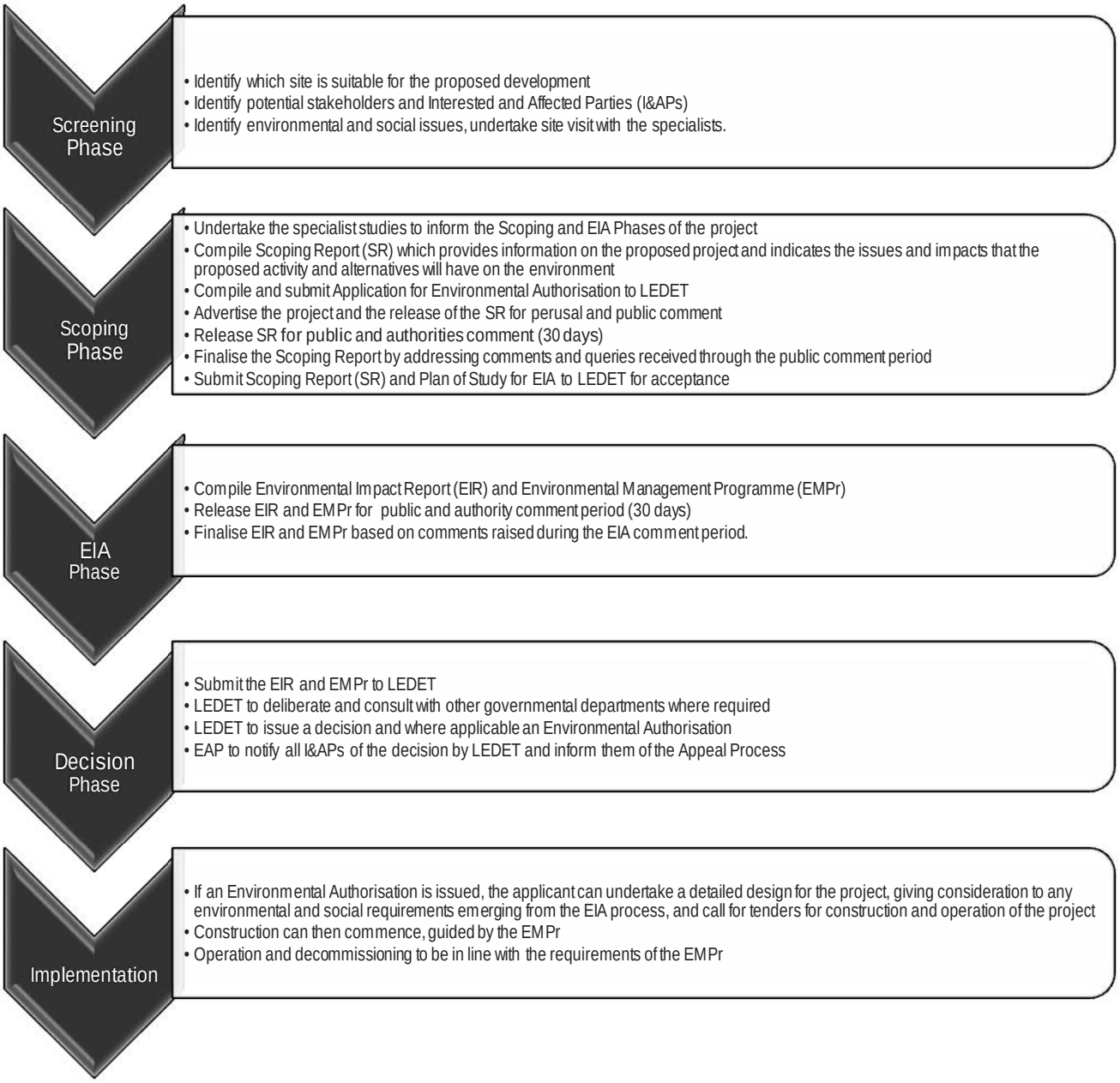


Figure 1-2| EIA process to be followed for the proposed PV facility for Venetia Mine

1.1.1 Application Phase

The Application Phase entails the submission of a signed EIA Application Form to notify the CA of the proposed PV facility. As indicated in Figure 1-2 above, the Application Form will be submitted to LEDET prior to the requisite 30-day Public Participation comment period. The LEDET's acknowledgement of receipt of the application will be attached to the Scoping Report when it is submitted to LEDET for approval. The full application is provided in Annexure I.

1.1.2 Scoping Phase

Scoping in the EIA process is the procedure used for determining the extent of, and approach to, the EIR Phase and involves the following key tasks:

- Further identification and involvement of relevant authorities and I&APs in order to elicit their interest in the project;
- Identification and selection of feasible alternatives to be taken through to the EIA phase;
- Identification of significant issues/ impacts associated with each alternative to be examined in the EIR, and mitigation measures that can be applied.
- Determination of specific Terms of Reference (ToR) for any additional specialist studies required in the EIR Phase (i.e. the Plan of Study for the EIR).

Various methods and sources were utilised to identify the potential social and environmental aspects associated with the proposed project and to develop the ToR for the specialist studies. The sources of information for the preparation of this report include, amongst others, the following:

- Collection of information regarding the project, as provided by the Applicant:
    - Project description;
    - Methodology for construction of the various project components;
    - Methodology during operations;
    - Expected timetable for project development;
    - Maps and figures, outlining the proposed facilities; and
    - Technical information relating to design.
- Other relevant EIRs;
- Environmental and social baseline[3] surveys for this site and surrounding areas;
- Consultation with the project team; and
- Consultation with I&APs, including authorities.

During the Scoping Phase, the SR must be subjected to at least a 30-day PPP. Therefore, the SR will be made available for public comment and review from 12 November 2021 to 12 December 2021 in terms of Regulation 3(7) of GN R 982 of 2014. On completion of the public comment period, the Scoping Report will be updated and finalised, taking cognisance of comments received and issues raised by I&APs.

Thereafter, the SR will be completed and submitted to the LEDET for review. LEDET must, within 43 days of receipt of the SR, consider it, and in writing –

(a) Accept the report and advise the EAP to proceed with the tasks contemplated in the Plan of Study for EIA;

[3] Since the proposed SEF sites are close to the existing Venetia mining operation, baseline conditions will reflect the impacts of existing mining activities.

(b) Refuse Environmental Authorisation if

(i) The proposed activity is in conflict with a prohibition contained in legislation, or

(ii) If the Scoping Report does not substantially comply with the objectives and content requirements for scoping reports in terms of the 2014 EIA Regulations and the applicant cannot ensure compliance with these regulations within the prescribed timeframe.

1.1.3 Screening Phase

A pre-application screening of two alternative sites was conducted prior to application (refer to Section 3.7.1) in order to confirm the suitability of the sites and to determine the preferred site on which to base the detailed assessments for inclusion in the Scoping and EIR phases. The Screening Phase consisted of the following components:

- Desktop review of the biophysical and social characteristics of the area;
- Various site visits were undertaken to determine the preferred site. The initial site visit was undertaken on 18 May 2021 assess Site 1 (Drumsheugh) and Site 2 (Regina).
- A further site visit to Drumsheugh and Regina took place on 4 August 2021 at the start of the scoping phase.
- The information gathered during the Screening Phase was used in refining the Plan of Study for the EIA process (Annexure G).
- Screening of the preferred site was undertaken according to the national web-based screening tool of DFFE, which is attached as Annexure H.

1.1.4 The EIR Phase

The Scoping Phase is typically followed by the EIR Phase, which is informed by the specialist investigations. This phase culminates in a comprehensive EIR that documents the outcome of the impact assessments.

1.2 ASSUMPTIONS, LIMITATIONS AND GAPS IN KNOWLEDGE

In undertaking this investigation and compiling the SR, the following assumptions and limitations apply:

- It is assumed that the information provided by the applicant is accurate and unbiased, and that no information that could change the outcome of the EIA process has been withheld.
- The scope of this investigation is limited to identifying and assessing the environmental and social impacts associated with the proposed PV facility and associated infrastructure to generate energy for the mining operations of the proposed PV plant. The project does not include any infrastructure upgrades, which may be required from Eskom to allow capacity in the local grid for the proposed project.
- At the time of compiling this report, the project was in conceptual design phase. Therefore, detailed designs were not yet available for the PV facility. Detailed designs will be generated if the project receives Environmental Authorisation from LEDET. In addition, micro-siting, based on additional specialist requirements during the EIA phase (if applicable) needs to occur.
- There will be no accommodation for the construction or operational phase staff on the SEF site.
- The SPV will follow relevant legislation related to closure and decommissioning of the facility once it reaches the end of its life.

1.3 INDEPENDENCE AND DETAILS OF THE EAP

The requirement for independence of the environmental consultant is aimed at reducing the potential for bias in the environmental process. Neither Zutari nor any of its sub-consultants are subsidiaries of De Beers, nor is De Beers a subsidiary to Zutari. Furthermore, none of these parties have any interests in secondary or downstream developments that may arise out of the authorisation of the proposed project.

Zutari has selected a team of highly experienced specialists and multi-disciplinary practitioners to execute this project in a professional and unbiased manner. A synopsis of the qualifications and experience of Zutari's Environmental Assessment team this project is provided hereunder. Full CVs are available in Annexure A.

The EAP, Mr Reuben Heydenrych, has extensive experience in the project management of various small and large-scale infrastructural and environmental projects. He is employed as an Environmental Practitioner at Zutari's Tshwane office. He has been involved in EIA processes in South Africa and in various other African countries, as required by relevant national legislation and in terms of international requirements as EIA team leader and team member. These projects have included exemptions, scoping, and full EIAs for projects such as rezoning, filling stations, water and sewage pipelines, roads (national, provincial and municipal), residential developments, game lodges, telecommunications structures, mines, infrastructure in sensitive environments and industrial processes. Reuben also has experience in environmental advisory services and strategic environmental management, including strategic environmental assessments, environmental scans, environmental feasibility studies and environmental management frameworks (EMFs); EMPrs for the construction and operational phases of infrastructure developments and environmental auditing, including due diligence assessments, ISO 14001 systems development and auditing, legal compliance and waste management audits.

He obtained a Master's in Philosophy: Environmental Management from the University of Cape Town, South Africa in 1993 and a Bachelors' Degree in Landscape Architecture from the University of Pretoria, South Africa, in 1991. Reuben is registered as a professional landscape architect with the South African Council for the Landscape Architectural Profession (SACLAP).

Mrs. Candice Dürr, one of the project members, was appointed by Zutari's Tshwane office as an Environmental Consultant. Candice has over seven (7) years of environmental science-related experience and has a Bachelor of Science degree in Environmental and Biological Sciences with an Honours degree in Environmental Management.

2 LEGAL FRAMEWORK

This section provides an overview of the legal documents, policy documents, and guidelines to consider when undertaking an EIA process. The EIA is being undertaken in accordance with relevant South African environmental legislation and takes into consideration international best practice.

2.1 RELEVANT LEGISLATION

Refer to Table 2-1 below for a list of the primary legislation applicable to the project and the applicability thereof.

Table 2-1 | Relevant legislation and the applicability thereof

Legal Requirements		
Legislation considered	Relevant Organ of State / authority	Aspect of Project
The Republic of South Africa Constitution Act (Act No. 108 of 1996) ("the Constitution")	The Constitutional Court	The environmental right contained in Section 24 of the Constitution provides that everyone is entitled to an environment that is not harmful to his or her well-being.
National Environmental Management Act (Act No. 107 of 1998) (NEMA)	Competent Authority (LEDET)	NEMA establishes the principles for decision-making on matters affecting the environment. Section 2 of the Act sets out the National Environmental Management principles which apply to the actions of organs of state that may significantly affect the environment. Furthermore, Section 28(1) states that "every person who causes or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring". If such pollution or degradation cannot be prevented, then appropriate measures must be taken to minimise or rectify such pollution or degradation. The applicant has the responsibility to ensure that the proposed activity and EIA process conform to the principles of NEMA. In developing the EIA process, Zutari has been cognisant of this need, and accordingly the EIA process has been undertaken in terms of NEMA and the EIA Regulations[4]. Several listed activities in these regulations are triggered, as indicated in Table 2-2 to Table 2-4.
National Water Act (Act No. 36 of 1998) (NWA)	Department of Water and Sanitation (DWS)	The NWA provides for the sustainable and equitable use and protection of water resources. It is founded on the principle that the National Government has overall responsibility for and authority over water resource management, including the equitable allocation and beneficial use of water in the public interest, and that a person can only be entitled to use water if the use is permissible under the NWA. Section 21 of the NWA specifies the water uses

[4]GN No. R 982, 983, 984, and 985 in Government Gazette No.38282 of 4 December 2014.

Legal Requirements		
Legislation considered	Relevant Organ of State / authority	Aspect of Project
		which require authorisation from the DWS in terms of the NWA before they may commence. De Beers will apply for Water Use Licences or General Authorisation registrations required in terms of the Section 21 of the NWA itself.
National Heritage Resources Act (Act No. 25 of 1999) (NHRA)	South African Heritage Resources Agency (SAHRA)	In terms of the NHRA, any person who intends to undertake "any development which will change the character of a site exceeding 5,000 m² in extent, or involving three or more existing erven or subdivisions thereof", "the construction of a road powerline, pipeline exceeding 300 m in length" or "the rezoning of site larger than 10,000 m² in extent…" must at the very earliest stages of initiating the development notify the responsible heritage resources authority, namely SAHRA or the relevant provincial heritage agency. These agencies would, in turn, indicate whether or not a full Heritage Impact Assessment (HIA) would need to be undertaken. Section 38(8) of the NHRA specifically excludes the need for a separate HIA where the evaluation of the impact of a development on heritage resources is required in terms of an EIA process. Accordingly, since the impact on heritage resources would be considered as part of the EIA process outlined here, no separate HIA would be required. SAHRA or the Limpopo Provincial Heritage Resources Authority (LIHRA), will review the heritage assessments and provide comments to the LEDET, which would consider these comments in their final environmental decision. However, should a permit be required for the damaging or removal of specific heritage resources such as palaeontological or archaeological objects, a separate application for such destruction would need to be submitted to the relevant heritage agency for approval.
National Forests Act (Act No. 84 of 1998) (NFA)	DFFE (Forestry Branch)	Notice no. 908 of 2014 (List of Protected Tree Species) under the National Forests Act (NFA) lists 47 trees species that are protected in South Africa. Such trees may not be removed or damaged in any way without a permit issued by the Department of Forestry, Fisheries and the Environment (DFFE). There is a high likelihood that some of these species may be located at the Venetia site. This implies that permits will be required for the removal or translocation of these trees for the development of the PV plant.
Conservation of Agricultural Resources Act (Act No. 43 of 1983) (CARA)	Department of Agriculture	The CARA makes provision for the conservation of agricultural resources through limiting the sub-division of agricultural land, maintaining the production potential of land, combating and preventing erosion, preventing the weakening or destruction of water sources, protecting vegetation, and combating weeds and invader plants. As such, as part of the EIA process, recommendations should be made to ensure that measures are implemented to maintain the agricultural production of land (if possible).
National Environmental Management: Biodiversity Act (Act No. 10 of 2004) (NEM: BA)	DFFE and LEDET	The NEM:BA aims to conserve and manage the country's biodiversity via protecting species and ecosystems, specifically those which are threatened or considered to be critically endangered. It also serves to regulate the management of alien vegetation. In terms of NEM:BA a list of endangered, critically endangered, vulnerable, and protected species has been promulgated (Section 6, Table 3 of the Act), which calls for an EIA process, should any of the listed species be identified on the site and need to be removed. An ecological impact assessment, comprising a wetland assessment, floral assessment and faunal assessment, has been undertaken to determine if any listed species are located on the proposed site.
National Environmental Management: Protected Areas Act (Act No. 57 of 2003) (NEM:PAA)	DFFE and LEDET	The NEM:PAA aims to provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity and its natural landscapes and seascapes; for the establishment of a national register of all national, provincial and local protected areas.

Legal Requirements		
Legislation considered	Relevant Organ of State / authority	Aspect of Project
		Chapter 2 of the National Environmental Management: Protected Areas Act, 2003 sets out the "System of Protected Areas", which consists of the following kinds of protected areas: - Special nature reserves, - National parks, - Nature reserves and - Protected environment This Act is applicable as the proposed project falls within three protected areas, namely the Venetia Limpopo Nature Reserve, the Vhembe Biosphere Reserve and the MCLWHS.
Limpopo Environmental Management Act (Act No. 7 of 2003) (LEMA)	Competent Authority (LEDET)	LEMA makes provision for the protection and conservation of the environment in the Limpopo Province and regulates a variety of environmental matters including protected areas; hunting of wild and exotic animals; the establishment of Wildlife Councils reports; inland fishing and the protection and aquatic systems; the protection of indigenous plants; restrictions on development and environmental impact reports; declaration and protection. LEMA provisions, especially with respect to provincial protected resources like protected species, will have to be considered.
The National Energy Act (Act No. 34 of 2008)	Department of Mineral Resources and Energy (DMRE)	One of the objectives of this Act is to promote sustainable development of renewable energy infrastructure. The proposed project will contribute to this objective and generate energy from a renewable resource.
Electricity Regulation Act (Act No. 4 of 2006)	National Energy Regulator of South Africa (NERSA)	The Act provides a national regulatory framework for the electricity supply industry. The Act requires registration and licensing of anyone wanting to generate, transmit, reticulate, distribute, trade, or import and export electricity. De Beers is interacting directly with NERSA regarding the transmission line linkages with the proposed PV facility.
Civil Aviation Act (Act 13 of 2009) [CAA]	Civil Aviation Authority	All proposed developments or activities in South Africa that could potentially affect civil aviation must be assessed by the South African Civil Aviation Authority (SACAA).

2.2 RELEVANT POLICIES

The following policies, although not directly applicable to the proposed project, were also considered:

- Policies regarding greenhouse gas and carbon emissions;
- White Paper on the Energy Policy of the Republic of South Africa (1998);
- White Paper on Renewable Energy (2003);
- NERSA Renewable Energy Feed In Tariff (REFIT) Guidelines (2009).
- National Integrated Resource Plan (IRP) (2019)
- The National Development Plan 2030 (2012).

2.3 RELEVANT GUIDELINES

This EIA process is informed by the series of national Environmental Guidelines[5], where applicable and relevant:

- EIA Guideline for Renewable Energy Projects (DEA, 2015).
- Scoping, Integrated Environmental Management Information Series 2 (DEAT, 2002).
- Stakeholder Engagement, Integrated Environmental Management, Information Series 3 (DEAT, 2002).
- Guidelines to minimise the impact on birds of Solar Facilities and Associated Infrastructure in South Africa (Smit, 2012).
- Guideline on Need and Desirability, EIA Guideline and Information Document Series (Department of Environmental Affairs and Development Planning (DEA&DP), 2013)[6].
- International Finance Corporation (IFC) Performance Standards for Environmental and Social Sustainability.

2.4 LISTED ACTIVITIES IN TERMS OF THE NEMA

The proposed project would trigger listed activities in terms of the NEMA EIA Regulations, 2014. These activities require authorisation in the form of an Environmental Authorisation from the LEDET prior to commencement. Listed Activities in GN No. 984 of 2014 require authorisation through a Scoping and EIR process, whilst those listed in GN No. 983 and GN No. 985 of 2014 require a Basic Assessment (unless they are being assessed under a Scoping and EIR process). The listed activities applicable to this project and being applied for in this EIA process are listed in Table 2-2 to Table 2-4.

Table 2-2 | Applicable listed activities in terms of GN No. 983 of 2014

GN R983 of 2014 (Basic Assessment)		
No.	Listed activity	Relevance of the activity
11	The development of facilities or infrastructure for the transmission and distribution of electricity- (i) outside urban areas or industrial complexes with a capacity of more than 33 but less than 275 kilovolts;	On-site infrastructure including underground cabling or overhead lines for distribution of electricity, with a capacity of up to 132kV would be required to connect the proposed PV facility to substations. The proposed facility is situated outside of the urban edge.
12	The development of- (x) buildings exceeding 100 square metres in size; (xii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs-	The PV facility would require buildings and supporting infrastructure such as a connection building, control building, guard cabin. It is anticipated that these would exceed 100 m^2. The proposed infrastructure is planned to be larger than 100m^2 and may be located within 32 m of a watercourse.

[5] Note that these Guidelines have not yet been subjected to the requisite public consultation process as required by Section 74 of R385 of NEMA.

[6] Although this guideline is written for the Western Cape, it remains only one available on the issue of need and desirability amongst the nine provincial authorities and two national authorities (DFFE and DMRE).

GN R983 of 2014 (Basic Assessment)		
No.	Listed activity	Relevance of the activity
	(c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse;	
19	The infilling or depositing of any material of more than 5 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 5 cubic metres from- (i) a watercourse;	Localised infilling of the drainage lines may occur to regulate stormwater drainage and provide a level surface for the PV panels and/or associated infrastructure.
24	The development of- (ii) a road with a reserve wider than 13,5 metres, or where no reserve exists where the road is wider than 8 metres;	Access roads and internal gravel roads may be constructed to facilitate servicing and maintenance of the site. However, the size of the roads cannot be confirmed yet. The length and width of the internal gravel roads and associated road reserves (if applicable) will be confirmed once designs have been finalised.

Table 2-3 | Applicable listed activities in terms of GN No. 984 of 2014

GN R984 of 2014 (Scoping and Environmental Impact Report)		
No	Listed Activity	Relevance of the Activity
1	The development of facilities or infrastructure for the generation of electricity from a renewable resource where the electricity output is 20 megawatts or more.	The proposed PV facility is located outside an urban area and would have a generation capacity of more than 20 MW.
15	The clearance of an area of 20 hectares or more of indigenous vegetation	The area of the site that will need to be cleared of indigenous vegetation will exceed 20 ha.

Table 2-4 | Applicable listed activities in terms of GN No. 985 of 2014

GN R985 of 2014 (Provincial Basic Assessment activities)		
No	Listed Activity	Relevance of the Activity
4	The development of a road wider than 4 metres with a reserve less than 13,5 metres. (e) In Limpopo: (aa) A protected area identified in terms of NEMPAA, excluding disturbed areas. (bb) National Protected Area Expansion Strategy Focus areas. (ee) Critical biodiversity areas as identified in systematic biodiversity plans adopted by the competent authority or in bioregional plans;	Internal gravel roads may be constructed to service and maintain the site. These gravel roads may be wider than 4 m. The length and width of the internal gravel roads and associated road reserves (if applicable) will be confirmed once the design has been made available or during the EIA phase. The site falls with an Ecological Support Area (ESA) and the northern boundary of the eastern portion is near a Critical Biodiversity Area (CBA). The site falls within the buffer zone of the Mapungubwe Cultural Landscape World Heritage Site. This corresponds with the National Protected Areas Expansion Strategy (NPAES, 2009) and the Limpopo C-Plan. The site also falls within the Vhembe

GN R985 of 2014 (Provincial Basic Assessment activities)		
No	Listed Activity	Relevance of the Activity
	(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.	Biosphere Reserve. This means the site falls within the 5km buffer of protected areas as defined in this listed activity.
10	The development of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres.	It is anticipated that less than 30 m^3 of dangerous goods (such as fuels needed during the construction phase) will be temporarily stored on site. Furthermore, no infrastructure or structures are planned to be specifically constructed for the temporary storage of these dangerous goods. The applicability of this Listed Activity will be confirmed during the EIA Phase once designs are available. Note that the battery energy storage system will make use of lithium batteries which does not constitute a dangerous good.
14	The development of — (ii) structures with a physical footprint of 10 square metres or more; (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: (aa) A protected area identified in terms of NEMPAA, excluding conservancies; (bb) National Protected Area Expansion Strategy Focus areas; (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 5kilometres from any other protected area identified in terms of NEMPAA or from the core area of a biosphere reserve.	The proposed solar farm will have various forms of infrastructure on site as listed below: • Solar PV panels • A substation • An operation and maintenance building • Weather stations • Transmission lines • Battery energy storage unit (non-hazardous) The physical footprint of the abovementioned infrastructure is likely to be 10 m^2 or more. The proposed site falls within the Vhembe Biosphere Reserve and Mapungubwe Cultural Landscape World Heritage Site.

2.5 OTHER POTENTIALLY APPLICABLE STANDARDS

The potential applicability of two further international standards (IFC Performance Standards for Environmental and Social Sustainability and the Equator Principles) are considered. These are important non-regulatory standards to consider as the project developer is likely to apply for financing from the International Finance Corporation (IFC) or a private bank that is a signatory to the Equator Principles.

2.5.1 IFC Performance Standards and Environmental and Social Sustainability

The IFC Performance Standards were developed to provide guidance on how to identify environmental and social risks and impacts of business operations. The standards are designed to help avoid, mitigate, and manage risks and impacts towards doing business in a sustainable way, including meeting stakeholder engagement and disclosure obligations. In South Africa the scope and intent of the IFC PS is addressed or partially addressed in the country's environmental and social regulatory framework.

Should the project developer want to apply for financing from the IFC or any of the Equator Principles Financial Institutions – see below), then it is imperative that the EIA process should conform to the IFC Performance Standards and that specialist studies undertaken as part of the EIA address IFC PS requirements.

Performance Standard 1 establishes the importance of:

a) integrated assessment to identify the environmental and social impacts, risks, and opportunities of projects;
b) effective community engagement through disclosure of project-related information and consultation with local communities and other interested parties on matters that directly affect them; and
c) the client's management of environmental and social performance throughout the life of the project.

Performance Standards 2 through 8 establish objectives and requirements to avoid, minimize, and where residual impacts remain, to compensate/offset for risks and impacts to workers, affected communities, and the environment.

The purpose, scope and potential applicability of each of the IFC Performance Standards to the project are summarised in Table 2-5.

Table 2-5: IFC performance standards

Performance Standard	Key Requirement	Applicability
PS1: Assessment and Management of Environmental and Social Risks and Impacts	This PS relates to integrating and managing environmental and social performance throughout the life of a project in line with national regulations and international standards.	This standard applies, as an environmental impact assessment is required for the powerline and PV facility.
PS2: Labour and Working Conditions	This PS aims to ensure that clients establish, maintain and improve worker-management relationship that promotes the fair treatment, non-discrimination and equal opportunity of workers, and compliance with national labour and employment laws and international standards (as defined by the International Labour Organisation, ILO)	This standard applies to the potential opportunity for employment of workers during the construction and operational phase of the project.

PS3: Resource Efficiency and Pollution Prevention	This PS aims to abate pollution to air, water, and land that may threaten people and the environment at the local, regional, and global levels. This PS promotes the ability of private sector companies to adopt such best available technologies and industry best practices where feasible.	This standard applies with respect to the selection of appropriate power generation technology.
PS4: Community, Health, Safety and Security	The role of this PS is to anticipate and avoid adverse impacts on the health and safety of the affected communities throughout the life of the project as a result of routine and non-routine events.	This standard applies to the powerline and PV plant, particularly with respect to occupational and community health and safety during construction.
PS5: Land Acquisition and Involuntary Resettlement	PS5 aims to anticipate and avoid physical and economic resettlement or, where avoidance is not possible, to minimise adverse social and economic impacts of economic and physical displacement.	This standard does not apply. There are no current residents on the affected properties whose economic or other rights may be adversely affected, other than the landowners.
PS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	This PS aims to protect, and conserve biodiversity based on the convention on biological diversity. It divides habitat into three categories: modified, natural, and critical.	This standard applies, since the sites proposed to be developed are considered "natural" sites. Depending on the species composition of these sites, they might also be considered "critical".
PS7: Indigenous Peoples	This PS deals with safeguarding Indigenous Peoples and aims to protect the interests of Indigenous Peoples during project implementation.	This standard does not apply. There are no indigenous peoples present on the affected properties.
PS8: Cultural Heritage	Cultural heritage refers to tangible forms of cultural heritage, such as tangible movable or immovable objects, property, sites, structures, or groups of structures, having archaeological (prehistoric), paleontological, historical, cultural, artistic, and religious values.	This standard may apply, since cultural heritage objects (e.g., old farmhouses, graves or archaeological sites) may be located on the sites.

2.5.2 Equator Principles

The Equator Principles (EPs) is a voluntary credit risk management framework for determining, assessing and managing environmental and social risks in project finance transactions. This framework comprises a set of principles adopted by the Equator Principles Financial Institutions (EPFIs) to ensure that the projects they finance are developed and implemented in a manner that is socially responsible and environmentally sound. These principles apply to project-financing with total project capital costs of US$10 million or more across all industry sectors.

Should the project developer want to apply for financing from an Equator Principles Financial Institution, it would be imperative that the EIA process should conform to the IFC Performance Standards and EP requirements.

Four versions of the EPs have been published since their origin in 2006. The potential applicability of the principles of EP IV, which have been in place since 2020, are outlined in Table 2-6.

Table 2-6: Equator Principles

Principle	Requirement	Applicability
1:Review and Categorisation	The project is screened and categorised in accordance with its anticipated risks on the same basis as IFC PS 1.	Same as IFC.
2: Environmental and Social Assessment	An ESIA needs to be conducted on the proposed project, similar to the requirements of IFC PS 1.	Same as IFC.
3: Applicable Environmental and Social Standards	The ESIA process must comply with the legal requirements of the country in which the project is proposed to be implemented. However, this principle recognises that standards differ across countries, and differentiates between Designated and Non- designated countries. The laws of Designated Countries are deemed to be sufficient to ensure effective assessment of environmental and social risks. Compliance with IFC PSs is required for projects in all Non-designated countries.	Since South Africa is a Non-designated country, the IFC PSs will apply.
4: Environmental and Social Management System and Equator Principles Action Plan	For all Category A and Category B Projects, the EPFI will require the client to develop or maintain an Environmental and Social Management System (ESMS).	Since it is likely that the proposed project would be categorised as a Category B project, the development and implementation of an ESMS would be required.
5: Stakeholder Engagement	For all Category A and Category B Projects, the EPFI will require the client to demonstrate effective stakeholder engagement as an ongoing process in a structured and culturally appropriate manner.	Same as IFC.
6: Grievance Mechanism	A Grievance Mechanism needs to be established as part of the ESMS for all Category A projects and, as appropriate, Category B projects.	It is advisable to develop a Grievance Mechanism for Category B projects.
7: Independent Review	For all Category A and, as appropriate, Category B Projects, an Independent Environmental and Social Consultant, not directly associated with the client, will carry out an independent review of the assessment documentation, including the ESMPs, the ESMS, and the stakeholder engagement process documentation to assist the EPFI's due diligence, and assess Equator Principles compliance.	The necessity for an Independent Reviewer will be dependent on the discretion of the applicable EPFI. Appointing an independent reviewer to confirm the adequacy of the EIA process would provide added risk mitigation.
8: Covenants	For all Projects, the client will covenant in the financing documentation to comply with all relevant host country environmental and social laws, regulations and permits in all material respects. Furthermore, for all Category A and Category B Projects, the client will covenant the financial documentation: a) to comply with the ESMPs and Equator Principles AP (where applicable) during the construction and operation of the Project in all material respects; b) to provide periodic reports in a format agreed with the EPFI at least annually; and c) to decommission the facilities, where applicable and appropriate, in accordance with an agreed decommissioning plan.	A Covenant with the EPFI would be required.

9: Independent Monitoring and Reporting	Independent monitoring of project compliance with the Equator Principles is required for the life of a loan for all Category A projects and Category B projects, as appropriate.	Independent monitoring would be required.

3 DESCRIPTION OF THE PROPOSED PROJECT

The purpose of this chapter is to provide an overview of the proposed PV facility and the activities associated with the various phases of the project. A description of the feasible project alternatives follows this introduction, after which the motivation for the project is described.

3.1 SITE LOCATION AND EXTENT

The Venetia Diamond Mine is situated approximately 80 km west of Musina and 36km north east of Alldays in the Limpopo Province. The SEF and associated infrastructure are proposed to be developed on the preferred site situated on the Remainder of Portion 0 of the Farm Drumsheugh 99 MS farm (referred to as the southern parcel) with an alternative, namely Portion 0 of the Farm Regina 68 MS (referred to as the northern parcel, or Site 2) as shown if Figure 3-1. Site 2 also transects small portions of farms Endora 66 MS and Halcyon 69 MS. Both sites have proposed transmission line corridors, which may affect additional farm portions, between the SEF and substations close to Venetia Mine. Figure 3-2 to Figure 3-5 provide photos of the two sites.

Sites 1 and 2 are respectively approximately 5.5 km and 11.8 km as the crow flies from Venetia Diamond Mine's substation to which electricity will be transmitted. This distance directly influences the length of transmission line that will be required to transmit the electricity to the mine's substation.

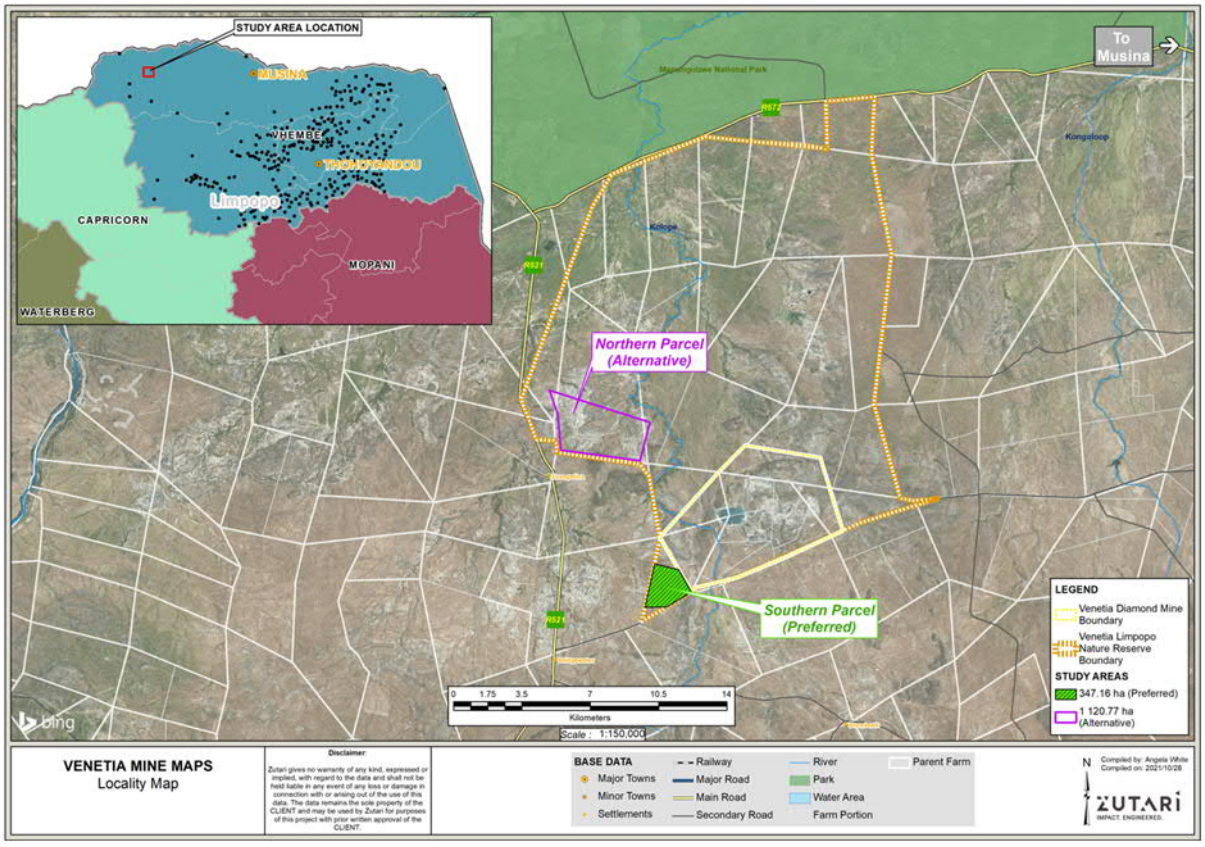


Figure 3-1 | Locality map indicating the Venetia Diamond Mine, the Venetia Limpopo Nature Reserve and the two site alternatives

The 21-digit Surveyor-General code of the property on which the PV facility is proposed is T0MS00000000009900000 (Farm Drumsheigh 99 MS, portion 0). This preferred site's transmission lines will cross the Farm Venetia 103 MS, portions 0, 1, 3 and 4, to connect with the substation at Venetia Mine.

Figure 3-2 | View of the Drumsheugh portion, facing the R521 to the south.

Figure 3-3 | View of culverts on the Drumsheugh portion on the southern boundary

Figure 3-4 | Panoramic view of the Regina portion of the site, looking west along the south boundary from top of the koppie.

Figure 3-5 | Constructed drainage channel and overhead power line running inside and parallel to the Regina site boundary

3.2 COMPONENTS OF THE PV FACILITY

The proposed project will include:

- An SEF, comprising of numerous rows of PV modules mounted on steel tracking mounts and footings (concrete or driven into the ground) with associated support infrastructure, including inverters;
- Internal access roads for servicing and maintenance of the site;
- Temporary equipment laydown areas for use during construction;
- Buildings, including a substation building, operation and maintenance building, guard cabin;
- Weather stations within the fenced perimeter of the site;
- Perimeter fencing with intrusion detection;
- Substation and/or switchyard located at the solar farm, to convert the power from solar farm medium voltage to high voltage for transmission;
- Overhead transmission line/s, to transmit power from the solar farm to the mine (described in more detail below);
- Extension to the existing substation and/or switchyard located at the mine, to convert the power from transmission voltage to mine voltage (11 kV);
- Battery energy storage systems, using non-hazardous lithium battery technology; and
- A borehole(s).

3.2.1 PV Modules

The solar PV panels use materials that convert solar radiation directly into electricity. Photovoltaic solar cells are divided into two distinct groups: Traditional crystalline silicon solar cells and thin film solar cells. The absorbed solar radiation excites the electrons inside the cells and produces what is referred to as a / the photovoltaic effect. The crystalline silicon solar cells are made from monocrystalline or polycrystalline silicon. The thin film technologies are comprised of thinner layers of semiconductor material. Photovoltaic solar power plants comprise of solar modules connected together to form solar arrays for the production of electricity. Direct current electricity is produced from the solar array which in turn is connected to inverters for conversion to alternating current. Power from the inverters is then stepped up via transformers to voltages suitable for injection into the national grid or directly to consumers.

The size of the PV modules vary between different PV technology types, but can typically be 2 to 4 m^2 each and sufficiently durable to last in excess of 20 years. These modules are arranged in arrays which are typically placed on mounting structures that are either fixed or tracking. The solar panels produce Direct Current (dc) electricity that runs through an inverter to produce Alternating Current (ac) electricity. The electricity can then be evacuated to a substation/s to supply the mine in a 'behind the meter' grid connection arrangement. Figure 3-6 illustrates a typical PV module.

Figure 3-6 | Typical PV modules[7]

3.2.2 Inverters and Transformers

In utility scale PV plants, solar PV modules are connected in series to form PV strings, which produce DC power at a low voltage (typically 1 000 – 1 500 V). This DC voltage is transformed into AC voltage by an inverter. Inverters are also key to the synchronisation and integration of the DC system into the grid. There are primarily three types of inverters, namely:

- Central inverters,
- String inverters, and
- Micro inverters.

For central inverters, the inverter and the transformer are typically housed together in a Power Conversion Unit (PCU). A central unit in the form of a shipping container is provided that is fully equipped and houses the inverter (sometimes multiple inverters) along with an LV/MV transformer. There are numerous PCU types available that vary significantly across manufacturers however the basic requirements typically allow the inclusion of the following:

- Inverters;
- Inverter (LV/MV) step-up transformer;
- MV Switchgear;
- Auxiliary transformer;
- LV Auxiliary distribution board;
- PCU Earthing;
- UPS; and
- Supervisory control and data acquisition (SCADA) communication cubicle.

[7] http://www.seia.org/policy/solar-technology (accessed: 14 February 2016)

For plants that use string inverters, a central unit containing a distribution board for collecting the inverters and an LV/MV transformer is required. This unit is referred to as the Pad-mounted Transformer Kiosk (PTK).

Unlike string inverters that transform power for a string of PV modules, micro inverters transform the power of each module individually. For large scale projects, this translates to higher initial equipment and control and instrumentation costs as well as complex maintenance.

Central inverters or string inverters will likely be selected for this project.

3.2.3 Mounting systems

Solar power plants can either have fixed tilt systems or tracking systems as shown in the figures below.

FIXED-TILT SYSTEMS

In fixed-tilt solar PV installations, the solar panels are mounted at a predetermined tilt and azimuth angle – remaining in this configuration permanently. The fixed PV configuration does not have any moving parts and hence is easier and cheaper to install and maintain resulting in increased reliability as opposed to tracking PV. Furthermore, a fixed tilt PV system is less constrained by uneven terrain, making it easier to install.

Figure 3-7: Fixed tilt system

TRACKING SYSTEMS

Tracking PV installations have the added benefit and capability of tracking the sun's movement throughout the day to maximise the energy collected. This is accomplished by reducing the incident angle – thus resulting in more energy attained by a tracking system as opposed to a fixed PV system. Within tracking PV, there are many options that are available:

- Single-axis trackers, which follow the sun's azimuth east-west each day;
- Single-axis tracking with fixed tilt, which follow the sun's azimuth east-west each day and is tilted at a fixed angle year-round depending on the latitude of the location;

- Dual-axis tracking, which follows both the azimuth and altitude angle above the horizon on a daily and seasonal basis respectively.

Figure 3-8: A single axis tracking system

3.2.4 Additional Infrastructure

The following additional infrastructure is expected to form part of the PV plant:

- Access and inside roads/paths – An access road to the site as well as internal roads between the PV arrays would need to be constructed.
- Trenching – all DC and AC wiring within the PV plant must be buried underground.
- Inverter/transformer building. The number of buildings will be dependent on the size of plant and inverters chosen. Alternatively, a pre-packaged inverter/transformer housed in a concrete substation for outdoors can be utilised.
- Guard house– A brick building of approximately 100m2 on the perimeter of the plant.
- Control room - The control room will contain switchgear and monitoring equipment for the PV plant.
- Connection to grid: The grid connection requires transformation of the voltage. The normal components and size of a distribution rated electrical substation will be required.
- A small switching station for the plant will be located on the outside of the control room.
- Foundations to support the PV panels.

3.2.5 Transmissions Lines and Substations

It is envisaged that the proposed PV facility would require an on-site substation and/switchyard, which will convert power from solar farm voltage to transmission voltage.)Overhead transmission lines would be required to transmit power from the solar farm to the mine.

3.3 CONSTRUCTION ACTIVITIES

Construction of the proposed PV facility is planned to start in 2022 and to be operational by the end of 2023, assuming all necessary authorisations are obtained.

The typical activities for the construction an SEF are as follows:

- Establishment of access roads: During the construction period internal roads need to be established; however, these roads will only be temporary. There are a number of

permanent roads that need to be established for operation and will be gravel based. Existing roads will be used, where possible.
- Site preparation: Vegetation would need to be cleared for the footprint of the infrastructure as well as for the access roads to the site/internal roads and the laydown of the yard, etc. Topsoil stripping from the construction of access roads and infrastructure would need to be stockpiled and used to rehabilitated areas of the construction footprint.
- Transportation of equipment and components to the site: The main component of the proposed facility would be transported by road to the site. Excavators, graders, trucks and compacting equipment will need to be brought to the site.
- Establishment of workshops, temporary laydown areas and equipment camps: Once all the equipment has been brought to the site, dedicated laydown and equipment camps will be established. Fuel will most likely be stored on site during construction; appropriate mitigation measures must be employed to ensure no pollution occurs as a result.
- Construction of the PV array: The foundations for the PV panel array will be excavated. Another option would be to use a ramming system for the support structure which does not require excavation but is dependent on the geotechnical condition of the ground. Concrete and aggregates would need to be brought to the site. Trenches would also need to be excavated for underground connection of the panels to the inverters and subsequently to the plant substation.
- Site rehabilitation: Removal of all construction equipment from the site and rehabilitation of areas where reasonable and practical.
- Drilling of a borehole(s).

3.4 OPERATIONAL ACTIVITIES

The PV solar facility operational lifespan is estimated at approximately 20-25 years. The facility would create a small number of permanent employment opportunities during operation.. The typical activities during the operational phase would be as follows:

- Operation of the electrical infrastructure and PV panels: Incoming solar radiation will be converted by the PV panels into electrical energy; associated inverters will convert this electrical energy into alternating current. This alternating current will be stepped up via transformers to grid voltage and transmitted via overhead cables to the substation. Electrical and mechanical routine maintenance will also be carried out.
- Cleaning of PV panels using water: To ensure maximum radiation exposure by the PV panels it is important to undertake periodic cleaning, as dust, dirt, pollen, and bird droppings can reduce the efficiency of PV panels. Panels generally need to be cleaned quarterly, but the frequency depends on weather conditions. Some softeners may be added to the washing water.
- Site security: Security will be stationed 24 hours a day on the site. The entire development area would be fenced off and security cameras installed.

3.5 DECOMMISSIONING PHASE

The PV facility's life span is expected to be 20 to 25 years after commissioning. The possibility of upgrading the proposed facility to more advanced technologies, to extend its operational lifespan, would be investigated towards the end of this period. Should the facility undergo expansion or significant upgrading, an environmental authorisation may be required at that time, in accordance with the prevailing legislation.

Should decommissioning be considered, it would potentially take 6 to 12 months to complete. The impacts of the decommissioning phase generally correlate closely with impacts identified for the construction phase. After disconnecting the PV infrastructure from the electricity network, the PV module components would be removed and recycled / resold as far as possible..

The rehabilitation of the disturbed areas would form part of the decommissioning phase. The aim would be to restore the land as close as possible to its pre-development vegetation conditions or to another suitable use e.g. grazing. The restoration activities would include the following:

- Removal of foreign materials and debris;
- Reshaping of the land to conform with the natural topography, if necessary;
- Breaking up compaction (ripping / scarifying) where required, loosening the soil and the redistribution of topsoil;
- Replanting with a suitable indigenous grass seed mix. Alternatively, the total footprint can immediately be reintroduced to game farming;
- Light irrigation to re-establish a biological soil crust and trigger germination and early growth; and
- Removal of alien vegetation for a period of no less than 1 year, or as otherwise prescribed by a rehabilitation specialist.

3.6 PROJECT NEED AND DESIRABILITY

The Venetia Mine operates 24 hours per day. Therefore, the mine is a large consumer of grid-supplied electricity from Eskom. De Beers wishes to develop the proposed PV solar energy facility in order to reduce the cost of energy for the mining operations. Currently, Eskom's power supply is uncertain, inconsistent and increasingly expensive. It is anticipated that Eskom's tariffs will escalate rapidly in the short to medium-term. This, together with the uncertainty of reliable electricity supply poses a risk to the future of the Venetia Mine.

The key intended outcomes of the project are:

- Reduced Carbon Footprint: The Anglo American Group, of which De Beers is a part, is aiming for a 30% reduction in emission by 2030 and wishes to become carbon neutral by 2040. The initiative for this mine is part of an approach across all Anglo American mines in Southern Africa.
- Energy Security: an ability to maintain mine operations in the event of an interruption of power from the grid. Since SEFs cannot store energy or dispatch energy on demand, battery storage is included in the proposed project to provide power at times when solar irradiation is limited or absent.
- Improved financial viability for the Venetia Mine. This means that, over the life of the project, the project will significantly reduce energy costs for the mine.
- Energy cost predictability for the Venetia mine. This means that the mine is able to make reasonable long-term predictions as to the cost of energy from the project.
- Community Involvement and stakeholder benefits. This implies the inclusion of local communities living around the mine to enable them to benefit from the project's implementation as part of a drive to create employment and improve the nearby communities' economic sustainability.
- Mining Charter Compliance: De Beers would like to contribute to the achievement (and, if possible, out-performance) of the Mining Charter requirements.

Bearing in mind these objectives, it is also important to consider that there are other outcomes that the proposed project cannot deliver. These are:

- Energy for the Community: A natural desire by communities would be that the project can contribute to electricity supply to local communities. However, as a mining company, De Beers is not empowered to become a Regional Electricity Distributor. Legislation currently only allows Eskom and municipalities to distribute electricity directly to consumers.
- Employment creation: It is expected that a significant number of short-term construction employment opportunities and a smaller number of permanent full-time jobs will be created. These numbers will be confirmed later. . .

The DEA&DP Guideline for Need and Desirability (2013)8 highlights the obligation for all proposed activities that trigger the EIA regulations to be considered against (amongst others) the National Framework for Sustainable Development9, the spatial planning context, broader societal needs, and financial viability. This information allows the authorities to contemplate the strategic context of a decision on the proposed project. This section seeks to provide the context within which the need and desirability of the proposed activity should be considered. The need for renewable energy is well documented and reasons for the desirability of solar energy include:

- Utilising the most abundant natural resource available to South Africa;
- Meeting nationally appropriate emission targets in line with global climate change commitments under the Paris Accord;
- Enhancing energy security by diversifying generation; and
- Creating a more sustainable economy.

3.6.1 Utilising resources available to South Africa

As illustrated in Figure 3-8, the region around Venetia Mine received between 1 972 kW/ hour/ m^2 and 2 118 kW/ hour/ m^2 radiation in the period from 1994 to 2018. Thus, the proposed site has a considerable solar resource potential.

South Africa generates most of its electricity from coal, of which there is currently a ready supply. However, the 2010 Integrated Resource Plan (Department of Energy, 2016) has highlighted the need for expansion of renewable electricity generation and targets an increase in solar PV generation capacity to 6.55% of the energy mix or 11.61% of installed capacity by 2050.

[8] This guideline, although written for the Western Cape, has been used as a best practice tool since it is the most recent guideline on need and desirability.

[9]Republic of South Africa (2008) People – Planet – Prosperity: A National Framework for Sustainable Development in South Africa. Pretoria: Department of Environmental Affairs (DEA), Republic of South Africa [Internet]. Available from: http://www.environment.gov.za [Accessed 29 March2011].

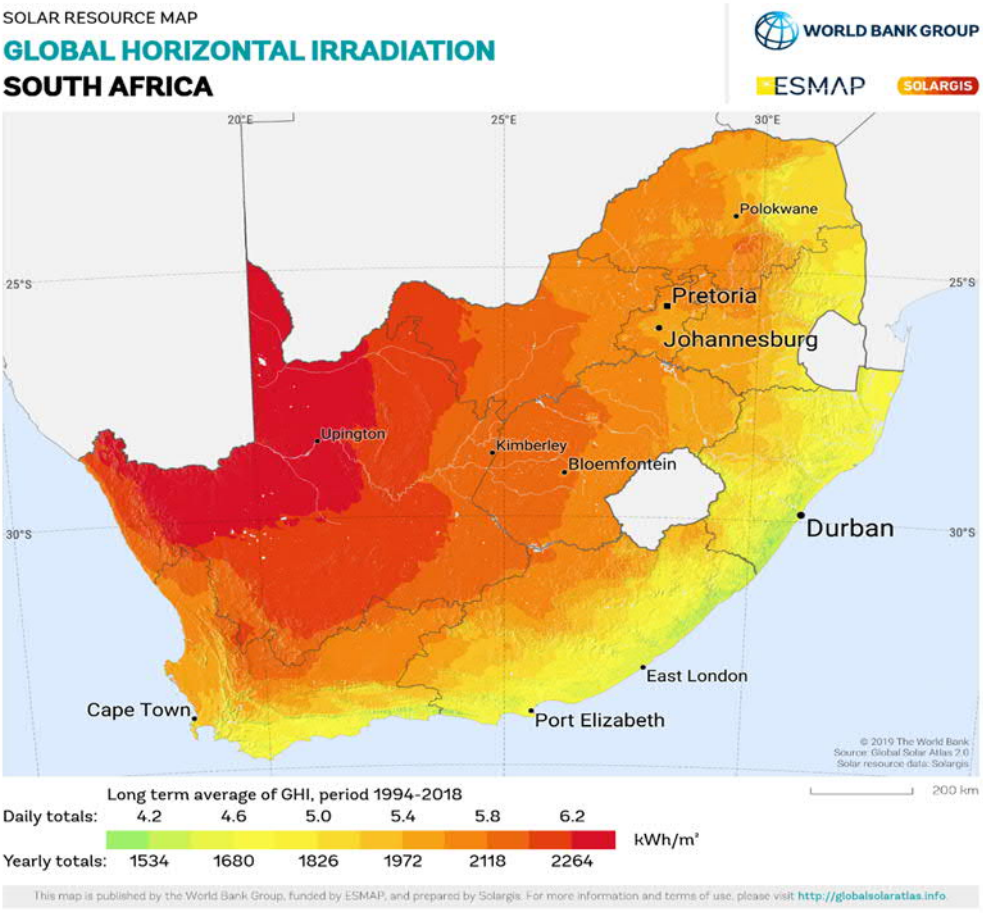


Figure 3-9 | Global Horizontal Irradiation for South Africa (source: http://solargis.info/doc/free-solar-radiation-maps-GHI, accessed on 20 October 2020)

3.6.2 Meeting Emission Targets in line with Global Climate Change Commitments

As can be seen by the numerous policies and legislation described in Section 2.1, the need for renewable energy is well-documented. Due to concerns such as climate change, and the on-going exploitation of non-renewable resources, there is increasing international pressure on countries to increase their share of renewable energy generation. As a result, the 2019 Integrated Resource Plan has proposed a target for 7.9 GW of solar PV, 11.4 GW of wind and 0.6 GW of concentrated solar installed capacity by 2030 (Department of Energy, 2019). The proposed PV project is expected to contribute positively towards climate change mitigation.

Renewable energy is recognized internationally as a major contributor in protecting the climate, nature and the environment, as well as providing a wide range of environmental, economic and social benefits that can contribute towards long-term global sustainability.

Solar energy is a source of "green" electricity as for every unit of "green" electricity used instead of traditional coal powered stations, the following benefits area realised:

- Saving water;
- Avoiding Sulphur Dioxide (SO_2) emissions;
- Avoiding Carbon Dioxide (CO_2) emissions including transmission losses; and
- Avoiding ash production associated with coal-fired electricity.

3.6.3 Enhancing Energy Security by Diversifying Generation

The establishment of the proposed PV facility would lighten the load on the existing Eskom electricity grid in the area by providing additional electricity supply during the day. Moreover, the project would contribute towards meeting the national energy target for the introduction of renewable energy into South Africa, as set by the Department of Energy (DoE). Should the proposed PV facility be developed, improved grid stability would benefit the Vhembe Region and the Limpopo Province.

The proposed project would also have international significance as it contributes towards South Africa being able to meet some of its international obligations, by aligning domestic policy with internationally agreed strategies and standards as those set by the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol, to both of which South Africa is a signatory.

3.6.4 Community development

The need to improve the quality of life for stakeholders, and especially for the poor, through job creation is critical in South Africa, particularly after the economic impact of COVID-19. A portion of the income from the sale of electricity to Venetia mine will go towards community development and the SPV is likely to include local ownership. Further community involvement would be achieved through direct employment or indirectly through service industries e.g. catering, subcontracting and accommodation.

3.6.5 Need and desirability checklist

Specific need and desirability questions raised by the DEA&DP need and desirability guideline are addressed in Table 3-1 below.

Table 3-1 | Responses to questions in the Need and Desirability Guideline: Timing

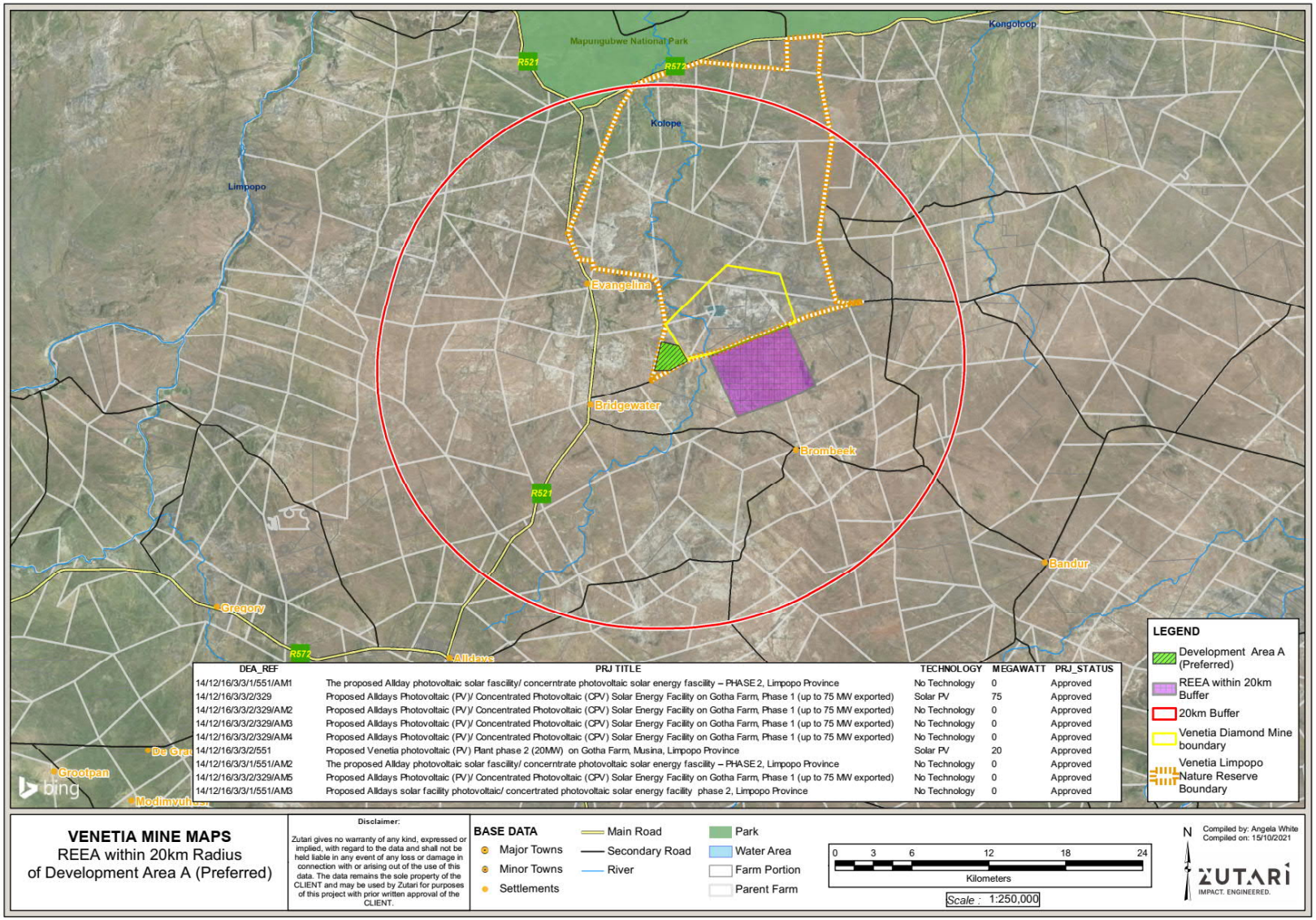
Question	Response
1. Is the land use (associated with the activity being applied for) considered within the timeframe intended by the existing approved Spatial Development Framework (SDF) agreed to by the relevant environmental authority i.e. is the proposed development in line with the projects and programmes identified as priorities within the Integrated Development Plan (IDP)?	The Musina Local Municipality (MLM) Spatial Development Framework (2019) states that renewable energy should be considered as an alternative energy in order to reduce the emission of greenhouse gasses. This is further motivated by the SDF's drive to mitigate climate change by making use of renewable energies. Section 4.1.10 (i) states that renewable energy, such as solar energy within the MLM should be capitalised in order to reduce greenhouse gasses from the generation of electricity. The Venetia Diamond Mine currently relies on Eskom grid electricity, produced primarily by coal-fired power stations. Developing a renewable energy source for the mine would assist the MLM in achieving its goal.
2. Should development, or if applicable, expansion of the town/ area concerned in terms of this land use (associated with the activity being applied for) occur at this point in time?	With the exception of the Venetia Mine's activities, the surrounding area is managed by De Beers as a protected area (the Venetia Limpopo Nature Reserve), with privately owned game farms surrounding the reserve. However, keeping the proposed solar PV plant as close to the existing mining area as possible (preferred site alternative) will ensure the least possible impact to surrounding land uses. In addition to the substantial environmental benefit of using renewable energy instead of carbon-based energy, the amount of water required for a solar PV plant is very small compared to coal-fired electricity.

Question	Response
3. Does the community/ area need the activity and the associated land use concerned (is it a societal priority)?	The solar PV plant in itself is not a specific societal need as the power produced by the facility will be used mainly by the Venetia Mine. However, the employment opportunities are a benefit to some of the surrounding communities, such as Musina and Blouberg.
4. Are there necessary services with appropriate capacity currently available (at the time of application), or must additional capacity be created to cater for the development?	Few additional services will be required for the proposed PV plant, particularly during the operational phase. The mine has its own waste disposal facility at which construction waste can be disposed. There is also a licenced landfill site in Musina. Very little operational waste will be generated. It is proposed that water for the project will be obtained from a borehole, assuming that yield tests confirm that sufficient underground water is available. Septic tanks on the site will be serviced by a contractor. Since only a limited number of people are expected to be employed during operation, the volume of sewage produced will be negligible. Overall, it is highly unlikely that additional pressure would be placed on existing services, with the exception of increased pressure on roads in the area.
5. Is this development provided for in the infrastructure planning of the municipality, and if not, what will the implication be on the infrastructure planning of the municipality (priority and placements of services)?	No. Once the proposed PV facility is operational, there would be a very limited requirements for municipal services. Hence the project is anticipated to have negligible implications for municipal infrastructure planning.
6. Is this project part of a national programme to address an issue of national concern or importance?	Yes. The establishment of the proposed Venetia Mine SEF would contribute to strengthening the Eskom electricity grid by reducing the demand on it. It would also contribute to the achievement of renewable energy generation targets in the Integrated Resource Plan and reduce the mine's carbon footprint, by substituting the use of coal-fired electricity with renewable (solar) electricity.

Table 3-2 | Responses to questions in the Need and Desirability Guideline: Placing

Question	Response
1. Is the development the best practicable environmental option (BPEO) for this land/ site?	Yes. The proposed site is suitable and feasible and the alternatives assessment conducted during the screening phase indicates that neither of the alternative sites have any environmental fatal flaws. The preferred site has the added benefit of being close to the existing mining boundary and therefore the footprint extension is limited. This is not the case with the northern parcel (Site 2). While both sites are located on the Venetia Diamond Mine's property, the fact that this property is managed as a nature reserve warrants the need to locate the solar PV plant as close as possible to the mine.
2. Would the approval of this application compromise the integrity of the existing approved Municipal IDP and SDF as agreed to by the relevant authorities?	No. The activity is broadly in line with the MLM's IDP and SDF objective that renewable energy should be considered as an alternative energy to reduce the emission of greenhouse gases.
3. Would the approval of this application compromise the integrity of the existing environmental management priorities for the area (e.g. as defined in Environmental Management Framework (EMF)),	The Venetia Limpopo Nature Reserve falls within the buffer zone of the Mapungubwe Cultural Landscape World Heritage Site (MCLWHS). The MCLWHS EMF lists the Venetia Limpopo Nature Reserve as a reserve not formally proclaimed, but consisting of 22 farm title deeds that are managed as a conservation area by De Beers with the objective of becoming self-sustainable.

Question	Response
and if so, can it be justified in terms of sustainability considerations?	The MCLWHS EMF lists climate change management as a priority for the area, with specific reference to water usage and the impacts on water resources. By making use of renewable energy instead of carbon-based energy, the mine's water usage and carbon footprint in general will be substantially reduced. The WCLWHS EMF further lists the promoting of renewable energy within the MCLWHS as a management priority under the infrastructure and municipal services section.
4. Do location factors favour this land use (associated with the activity applied for) at this place?	Yes. The electricity produced by the proposed development would be used directly by Venetia Diamond Mine. The site was chosen due to its ownership by De Beers, and its proximity to the mine, which minimises capital costs for transmission lines and losses along the transmission lines. This prevents the need to acquire land from other parties and the potential of displacement and resettlement that often accompany land acquisition processes. An examination of the technically feasible site alternatives was undertaken in the screening phase.
5. How will the activity or the land use associated with the activity applied for, impact on sensitive natural and cultural areas (built and rural/ natural environment)?	Potential impacts associated with the proposed project have been assessed at scoping level and are discussed in this report (refer to Section 4). It is important to keep in mind that this site, although part of a mining development and owned by De Beers, falls within the buffer zones of both the Vhembe Biosphere Reserve and the MCLWHS. These sensitivities will be carefully considered during the specialist- and impact assessments.
6. How will the development impact on people's health and wellbeing (e.g. in terms of noise, odours, visual character and sense of place, etc.)?	The project is not expected to affect health negatively as it is a renewable energy project. While the development will reduce the reliance on carbon-based energy (which causes substantial pollution and negative impacts), the installation of solar PV panels is expected to negatively affect the visual quality of the site. These potential impacts will be thoroughly assessed and have been summarized as expected impacts in Section 4.
7. Will the proposed activity or the land use associated with the activity applied for, result in unacceptable opportunity costs?	The site is managed by De Beers as part of its privately-owned Venetia Limpopo Nature Reserve. Socio-economic impacts have been considered as potential impacts as discussed in Section 4. The opportunity costs will be considered during the EIA phase of the project. There are few other alternative land uses in this area, besides game farming, that can be considered as alternative land use options.
8. Will the proposed land use result in unacceptable cumulative impacts?	Unacceptable cumulative impacts are unlikely. The use of renewable energy is strategically substantially more acceptable than the use of energy produced by a coal-fired power station. The only other large-scale project with significant environmental impacts in the vicinity of the site is Venetia Diamond Mine itself. One other environmental application for a solar PV plant is known within a 20km radius of the proposed SEF. This is proposed on the farm Gotha, south of the Venetia Dimond Mine, as shown in Figure 3-10 for known Renewable Energy Environmental Applications (REEAs). Cumulative impacts of the proposed SEF is conjunction with the other proposed SEF plant and Venetia Diamond Mine will be considered in the EIA phase. During that phase, it will be confirmed on what portion of the Gotha farm an SEF is proposed to be constructed, what design and size is proposed for the plant and whether the plant is likely to be constructed.



DEA_REF	PRJ TITLE	TECHNOLOGY	MEGAWATT	PRJ_STATUS
14/12/16/3/3/1/551/AM1	The proposed Allday photovoltaic solar fascility/ concerntrate photovoltaic solar energy fascility – PHASE 2, Limpopo Province	No Technology	0	Approved
14/12/16/3/3/2/329	Proposed Alldays Photovoltaic (PV)/ Concentrated Photovoltaic (CPV) Solar Energy Facility on Gotha Farm, Phase 1 (up to 75 MW exported)	Solar PV	75	Approved
14/12/16/3/3/2/329/AM2	Proposed Alldays Photovoltaic (PV)/ Concentrated Photovoltaic (CPV) Solar Energy Facility on Gotha Farm, Phase 1 (up to 75 MW exported)	No Technology	0	Approved
14/12/16/3/3/2/329/AM3	Proposed Alldays Photovoltaic (PV)/ Concentrated Photovoltaic (CPV) Solar Energy Facility on Gotha Farm, Phase 1 (up to 75 MW exported)	No Technology	0	Approved
14/12/16/3/3/2/329/AM4	Proposed Alldays Photovoltaic (PV)/ Concentrated Photovoltaic (CPV) Solar Energy Facility on Gotha Farm, Phase 1 (up to 75 MW exported)	No Technology	0	Approved
14/12/16/3/3/2/551	Proposed Venetia photovoltaic (PV) Plant phase 2 (20MW) on Gotha Farm, Musina, Limpopo Province	Solar PV	20	Approved
14/12/16/3/3/1/551/AM2	The proposed Allday photovoltaic solar fascility/ concerntrate photovoltaic solar energy fascility – PHASE 2, Limpopo Province	No Technology	0	Approved
14/12/16/3/3/2/329/AM5	Proposed Alldays Photovoltaic (PV)/ Concentrated Photovoltaic (CPV) Solar Energy Facility on Gotha Farm, Phase 1 (up to 75 MW exported)	No Technology	0	Approved
14/12/16/3/3/1/551/AM3	Proposed Alldays solar facility photovoltaic/ concertrated photovoltaic solar energy facility phase 2, Limpopo Province	No Technology	0	Approved

Figure 3-10: Other renewable energy environmental applications (REEA) within a 20km radius of the proposed project

3.7 PROJECT ALTERNATIVES

NEMA requires that alternatives be considered during the EIA process. According to DEAT (2004) "an alternative can be defined as a possible course of action, in place of another, that would meet the same purpose and need".

The DEA&DP Guideline on Alternatives (2013)[10] states that "every EIA process must identify and investigate alternatives, with feasible and reasonable alternatives to be comparatively assessed. If, however, after having identified and investigated alternatives, no feasible and reasonable alternatives were found, no comparative assessment of alternatives, beyond the comparative assessment of the preferred alternative and the option of not proceeding, is required during the assessment phase. What would, however, have to be provided to the Department in this instance is proof that an investigation was undertaken and motivation indicating that no reasonable or feasible alternatives other than the preferred option and the no-go option exist."

The 2014 EIA Regulations (GN No. R982) provide the following definition:
"Alternatives", in relation to a proposed activity, means different means of meeting the general purpose and requirements of the activity, which may include alternatives to the—

(a) property on which or location where the activity is proposed to be undertaken;
(b) type of activity to be undertaken;
(c) design or layout of the activity;
(d) technology to be used in the activity;
(e) operational aspects of the activity; and
(f) includes the option of not implementing the activity (No-Go alternative).

In addition to the list above, the DEA&DP Guidelines on Alternatives (2013) also consider the following as alternatives:

(a) Demand alternatives: Arises when a demand for a certain product or service can be met by some alternative means (e.g. the demand for electricity could be met by supplying more energy or using energy more efficiently by managing demand).
(b) Input alternatives: Input alternatives are applicable to applications that may use different raw materials or energy sources in their process (e.g. Industry may consider using either high sulphur coal or natural gas as a fuel source).
(c) Routing alternatives: Consideration of alternative routes generally applies to linear developments such as power line servitudes, transportation and pipeline routes.
(d) Scheduling and timing alternatives: Where a number of measures might play a part in an overall programme, but the order in which they are scheduled will contribute to the overall effectiveness of the end result.
(e) Scale and magnitude alternatives: Activities that can be broken down into smaller units and can be undertaken on different scales (e.g. for a housing development there could be options of 10, 15 or 20 housing units. Each of these alternatives may have different impacts.

[10] This guideline has been used as a best practice tool since it is the most recent South African guideline on alternatives.

An important function of the Scoping Phase is to screen alternatives to derive a list of reasonable and feasible alternatives that need to be assessed in further detail in the EIA Phase. The following types of alternatives are the most pertinent to the proposed project and are considered in this Scoping Report:

- Location alternatives;
- Technology alternatives; and
- The no-go alternative

The alternatives that have been considered are described in the subsequent sections.

3.7.1 Location Alternatives

De Beers initially identified two sites for the development of the proposed PV facility based on the following main criteria:

- Land availability and ownership;
- Size of the property; and
- Distance to substations at Venetia Mine.

These two sites vary in size and are located on different farm portions. The details of these sites are presented in Table 3-3 and the sites are identified in Figure 3-1. Layouts of the SEF on the alternative sites are shown in Figure 3-11 and Figure 3-12.

Table 3-3 | Details of the proposed site alternatives

Site	Property details	Size
Site 1	Drumsheugh 99 MS	348 ha
Site 2	Regina 68 MS	1122 ha

A site selection process was undertaken to ensure that resources employed during the EIA process are focused on the site(s) that is/are technically (including financially), biophysically and socially suitable.

The factors that were considered in site selection included the following:

- Environmental (heritage, terrestrial and aquatic biodiversity)
- Social factors, including avoidance of resettlement
- Points of interest
- Land cover
- Slope
- Mining plans
- Other intended uses of land

The findings by the heritage and biodiversity specialists that participated in the environmental screening (the same specialists as those participating in the Scoping Report) concluded that neither of the two sites have environmental or social sensitivities that could be regarded as fatal flaws.

Table 3-4 provides a summary of the environmental and social attributes of the alternative sites.

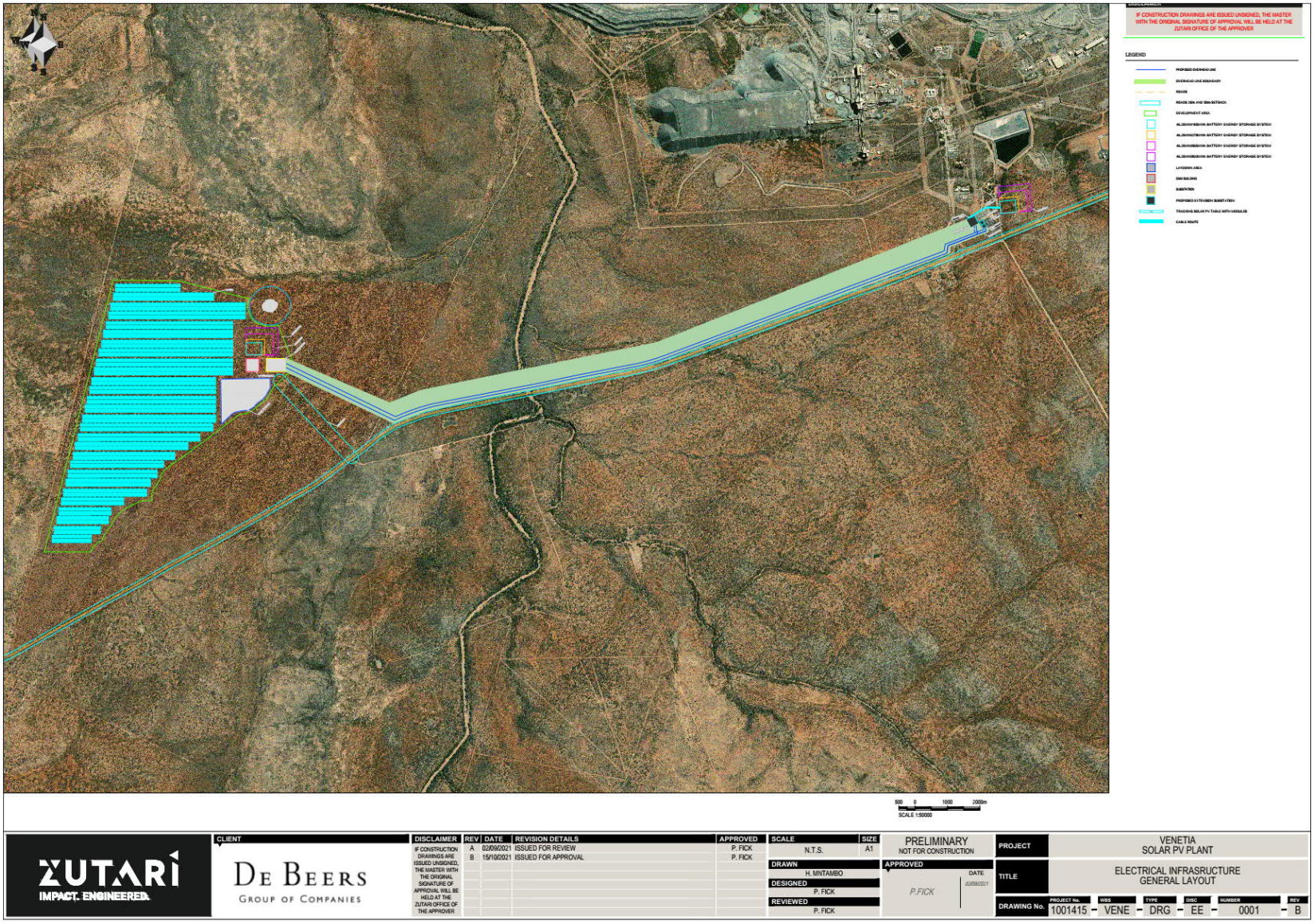


Figure 3-11 Proposed SEF layout on Site 1, including the transmission line corridor

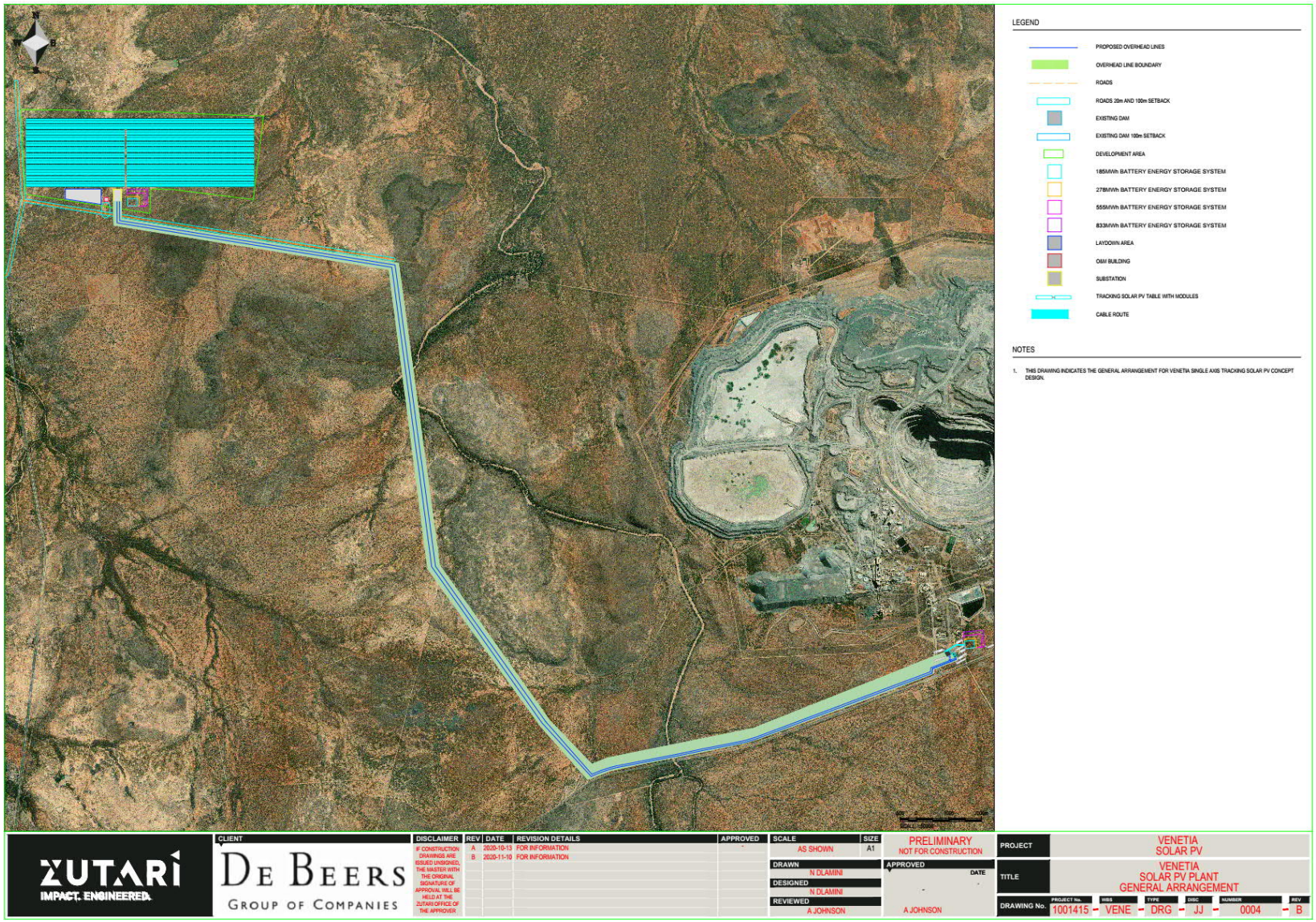


Figure 3-12 Proposed SEF layout on Site 2, including the transmission line corridor

Table 3-4 | Summary of factors influencing site suitability of the alternative sites

Site suitability factor	Drumsheugh (Site 1)	Regina (Site 2)
Heritage	Both sites fall within the Mapungubwe Cultural Landscape World Heritage Site (MCLWHS). However, no important cultural or heritage resources, archaeological materials or grave sites were identified. Although both sites occur within the MCLWHS, they occur on the southern-most boundary of this area and within the MCLWHS's buffer zone. Although the sites occur within the private Venetia Limpopo Nature Reserve, both sites are close to Venetia Mine, which detracts from the sense of place of the MCLWHS. Hence, the impact of a development on either of the alternative sites on the historical and heritage value of the MCLWHS would be limited. The well-known and internationally renowned heritage sites that give the Mapungubwe National Park (MNP) and the MCLWHS its value are located in the MNP, more than 20km north of the site. Furthermore, the sites do not contain landscapes and riverine features such as the Limpopo River and flat-topped hills that give the MNP its distinctive character and visual appeal.	
	An Iron Age site is known to occur on the southeast boundary of the Drumsheugh Farm, outside of the proposed project footprint. The remains of a damaged concrete reservoir south of the Kolope non-perennial stream has also been noted. This infrastructure represents the historical period (the 19th century). This infrastructure is older than sixty years and qualifies to be protected in terms of the National Heritage Resources Act 25 of 1999, and may not be (demolished, altered, renovated or removed) without the permit from South African Heritage resources Agency. The site could be avoided during micro-siting of the transmission line pylons.	No heritage sites were identified on Site 2. This site is marginally preferred over Site 1 since it is not known to contain any heritage sites. However, since the concrete reservoir along the transmission line for Site 1 can easily be avoided, the difference between the sites is insignificant enough for either of the sites to be preferred.

Terrestrial and aquatic biodiversity (see Figure 3-13 and Figure 3-14)	Site 1 falls entirely within a Critical Biodiversity Area (CBA) 2 and borders an Ecological Support Area (ESA). Vegetation cover is dense woodland of Mopane trees, with two species of protected trees (Baobab and Shepherd's tree) found on the site.	Small portions of the northern parcel (Site 2) includes a CBA 2 area and a CBA 1 on its western and northern boundaries, respectively. The remainder of Site 2 falls within an ESA. The Venetia Limpopo Nature Reserve management recommends avoiding most parts of the northern parcel and using only the southwestern part of the parcel due to the importance of the water resources in the site to wildlife in the area. The terrestrial ecology for the northern parcel is similar to that of the southern parcel, with Baobab and Shepherd's tree also found scattered on the site.

Aquatic ecology: The Kolope River runs close to both the preferred and alternative sites.
Both sites include regulated area of a wetland (within 500m). There are also drainage lines present on both sites. However, the associated transmission lines for site 2 has the potential to cause a larger impact on aquatic sensitivities as it will require at least two crossings of the Kolope river and have a larger impact on surrounding wetlands. The preferred site's proposed transmission lines also cross the Kolope river, however no wetlands are known to exist between the site and the Venetia Mine substation.

The aquatic assessment to be conducted as part of the EIA phase of the project will provide more in-depth detail regarding the aquatic sensitivities.

Two vegetation types are recognized on the sites (Figure 3-15):

Musina Mopane Bushveld (SVmp 1): Mucina and Rutherford (2013) regard this as a least Threatened vegetation type, occurring on undulating to very irregular plains. In the western section, including these sites, it forms an open woodland to moderately closed shrubland dominated by *Colophospermum mopane* (Mopane) on clayey bottomlands and *Combretum apiculatum* on hills. This vegetation type has a conservation target of 19%, with only 2% being formally conserved in Mapungubwe National Park, Nwanedi and Honnet Nature Reserves, with an additional 1% conserved in Baobab Tree Reserve. Roughly 3% of this vegetation type is transformed, mainly by cultivation. Erosion is moderate to high.

Limpopo Ridge Bushveld (SVmp 2): Mucina and Rutherford (2013) regard this as a Least Threatened vegetation type. It has a conservation target of 19%, with 18% being formally conserved in the Kruger National Park and Mapungubwe National Park. An

additional 1% is conserved in the Baobab Tree Reserve. Hence, this vegetation type has met its conservation target. Only about 1% of this vegetation type is transformed, mainly by agriculture and mining.

These vegetation types are represented on the alternative sites as follows:

Vegetation type	Size	Percentage
Site 1		
Limpopo Ridge Bushveld (SVmp2)	0	0
Musina Mopane Bushveld (SVmp1)	347.16 ha	100 %
Site 2		
Limpopo Ridge Bushveld (SVmp2)	516.52 ha	46.08 %
Musina Mopane Bushveld (SVmp1)	604.25 ha	53.91 %

Considering that the predominant land use in this region is game farming, and the protection provided by the MCLWHS and Vhembe Biosphere Reserve, neither of these vegetation types, which dominate the Limpopo River Valley east of Alldays and north of the Soutpansberg, is under immediate threat from this development.

	Site 1 is within the regulated 500m buffer of only one wetland, which is located across the road opposite to the site. The transmission lines will cross the Kolope River once.	The Limpopo C-Plan identifies four wetlands on Site 2. The sizes of these wetlands are small. Although the wetlands themselves do not take up significant space on the land parcel, their 500m regulated buffers cover most of the site. The transmission lines will cross the Kolope River three times and will cross two wetlands.
	Site 1 is the preferred alternative site from a biodiversity perspective because: • *There are no known wetlands on Site 1* • *Transmission lines cross the Kolope River only once* • *The total length of the transmission lines between the SEF site and the mine is approximately 5.8km.*	*Site 2 is the least preferred site from a biodiversity perspective because:* • *There are larger number of wetlands on Site 2* • *Most of the site is considered important habitat for wildlife* • *Transmission lines will need to cross the Kolope River and two wetlands* • *The total length of the transmission lines between the SEF site and the mine is approximately 15.4 km.*
Social impacts	The following social impacts of the project can be expected to be similar for both sites, since the projects will involve the same investments, employment numbers and opportunities on both sites: ▶ Local and national economic opportunities	

	▶ Employment and skills transfer ▶ Environmental impacts with a social dimension (e.g. nuisance impacts such as dust and noise) experienced by neighbouring landowners ▶ Impacts on community safety and security ▶ Generation of renewable energy, alleviating pressure on the Eskom grid ▶ Expectations in terms of employment, procurement, ownership, etc. ▶ Concerns regarding water allocation *From a social perspective, neither site is preferred.*	
Transmission	The southern parcel is closest to the mine, resulting in a shorter transmission distance (5.8 km), lower cost and lowest transmission losses of the two sites. *This is the preferred site from a transmission perspective.*	The longer distance from the mine to the substations at the mine (total length of transmission lines 15.4km) and will result in greater transmission losses and higher costs to construct the powerline. The additional pylon structures required will also result in larger areas of disturbance compared to Site 1. *This is the less preferred site from a transmission perspective.*
Visual impacts	Both sites are located in close proximity to public roads, which implies that the proposed SEF will be equally visible on both sites. Site 1 is visible from the east-west aligned road that passes the entrance to Venetia Mine, and Site 2 is visible from the R 521. The landscape is similarly flat and the vegetation structure has similar density and height around both sites. Thus, neither site offers better visual screening than the other. Land uses (primarily game farming) are also the same around both sites. Therefore, no particularly sensitive viewers would be affected more by one site than another. However, Site 1 is closer to Venetia Mine, which with its mining infrastructure, tailings dams and other disturbances already creates an expectation of mining impacts close to Site 1. Hence, in terms of visual impact, Site 1 is marginally preferred over Site 2, since Site 1 is located adjacent to an area that already experiences significant visual impacts. Furthermore, the longer length of transmission lines required for Site 2 (due to its greater distance from the mine) has the potential for more extensive visual impacts than the transmission lines for Site 1.	

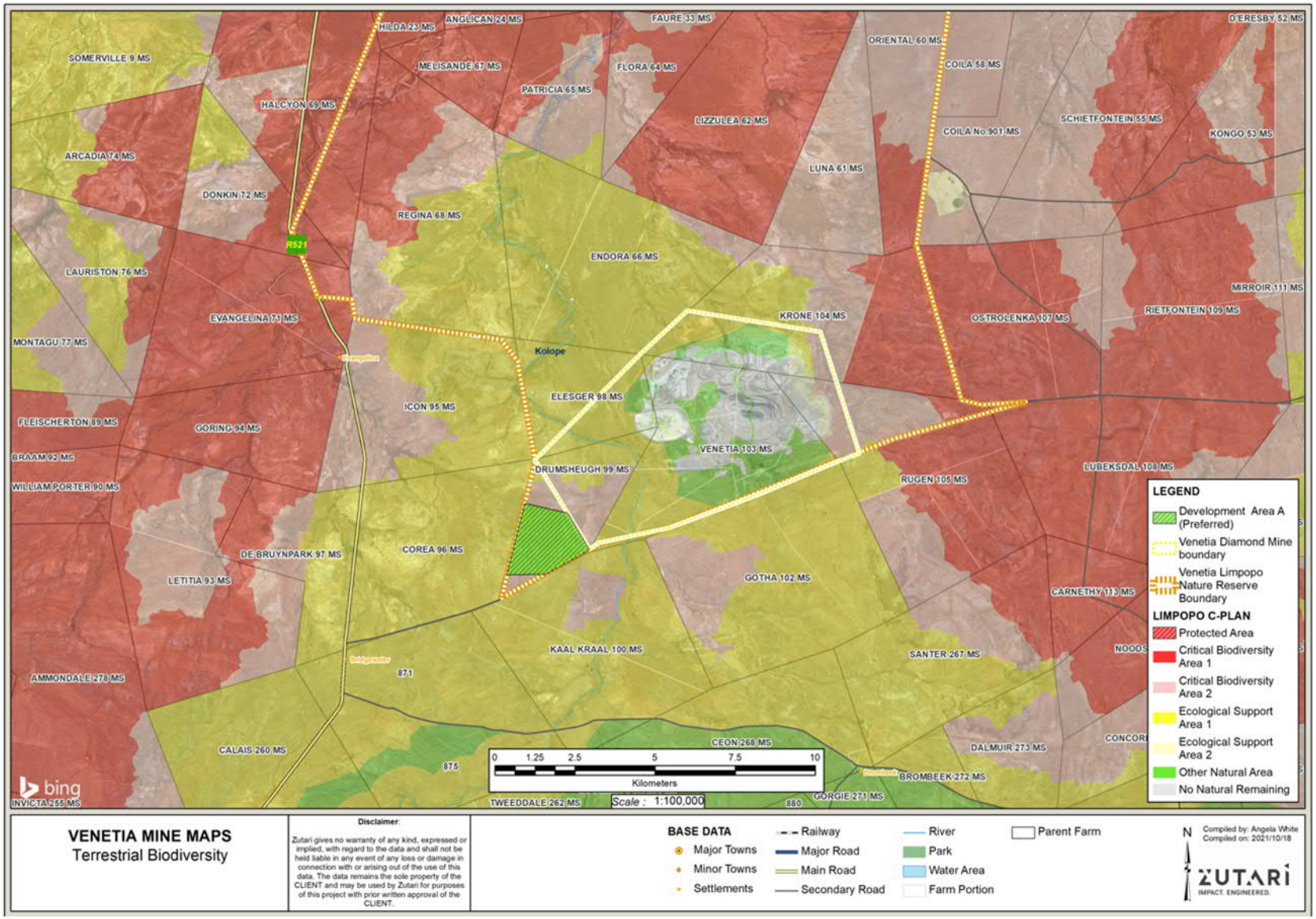


Figure 3-13 Terrestrial biodiversity constraints for the study area according to the Limpopo Conservation Plan (C-Plan)

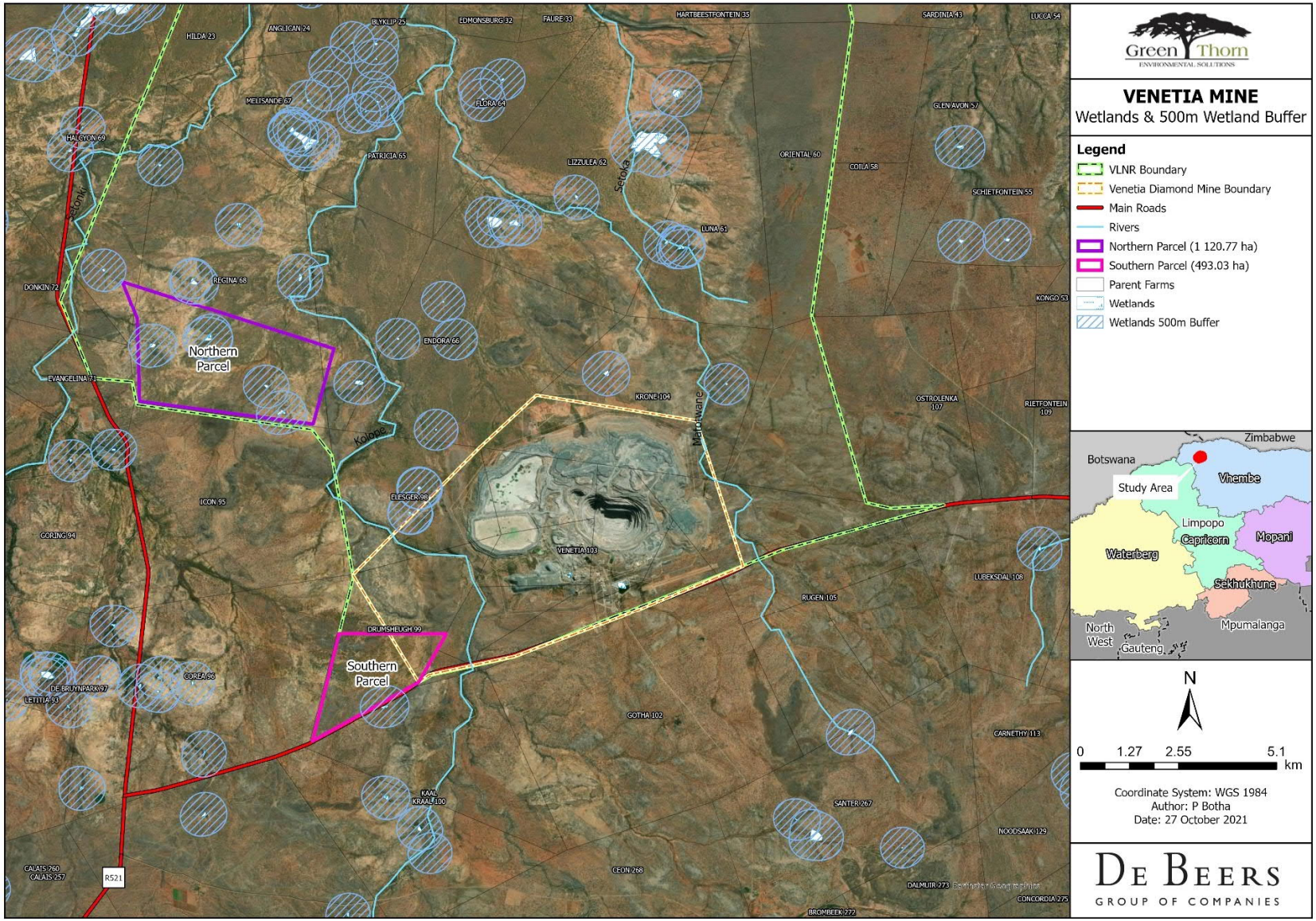


Figure 3-14 Wetlands within the study area mapped according to the Limpopo C-Plan

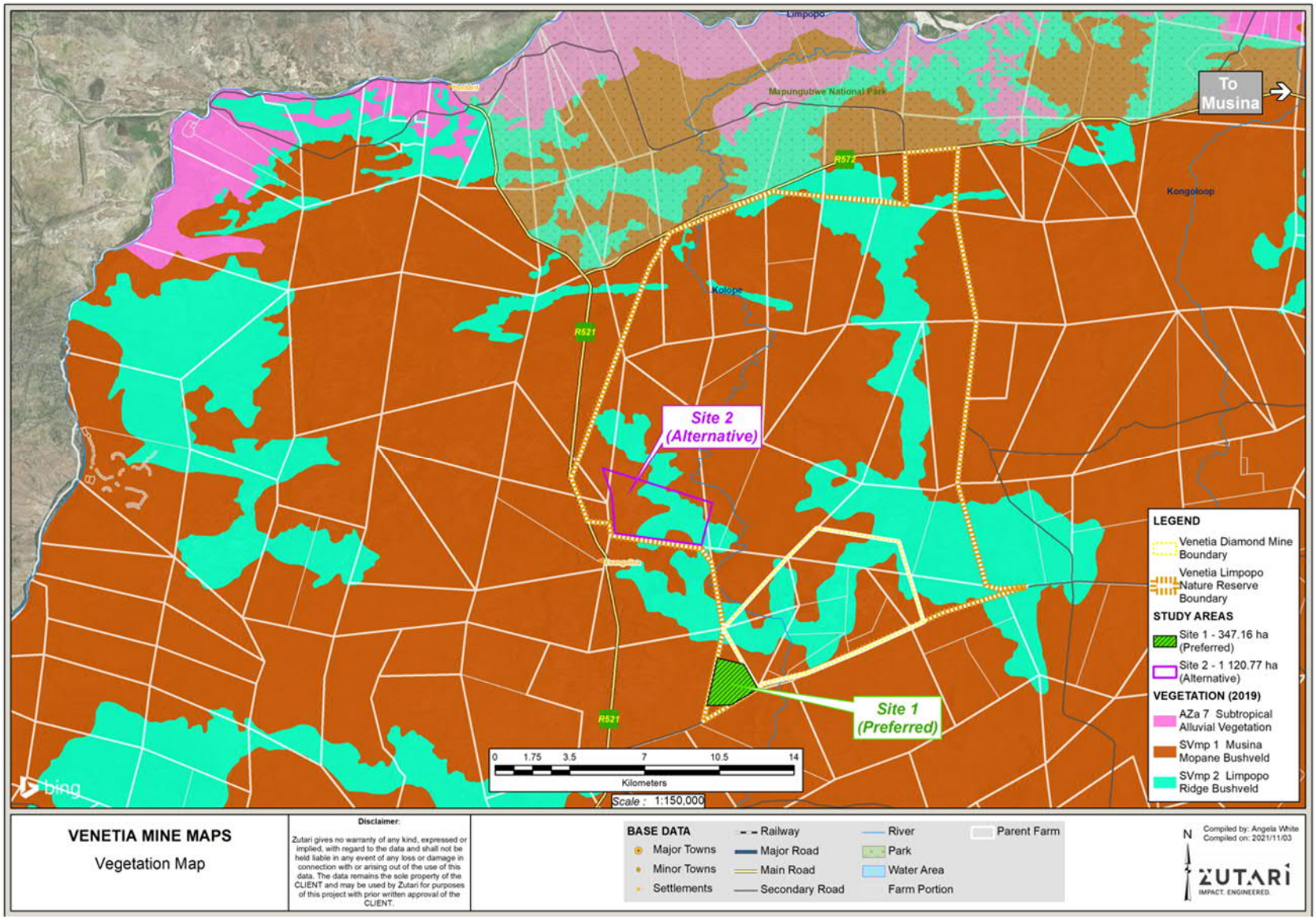


Figure 3-15 National vegetation types of the region, with site boundaries overlaid

Based on the above-mentioned factors that influence the environmental and social suitability of the alternative sites, the following conclusions can be made regarding site preferences:

- Neither site is preferred from a heritage perspective. Although Site 2 has no known heritage sites, the concrete reservoir on Site 1 can be easily avoided.
- Site 1 is preferred from a biodiversity perspective.
- Site 1 is preferred from a transmission perspective.
- Neither site is preferred from a social perspective.
- Neither site is preferred from a visual perspective.

Considering the above, and the fact that no fatal flaws were identified on either of the site alternatives, the choice of preferred site can be based on technical factors, since the environmental factors do not clearly distinguish either of the two sites. Accordingly, since Site 1 is technically preferred, this is the preferred alternative to be considered for further study in the EIA phase.

3.7.2 Technology Alternatives

Since the objective of the proposed development is to generate electricity for direct use by the Venetia mining operations only relevant energy generation technologies were considered.

The site under investigation, with its high solar resource potential and low wind resource potential, is best suited for solar generation technologies.

3.7.2.1 Mounting alternatives

Energy yields from PV cells are directly proportional to exposure to sunlight. The energy yield is higher when the module faces towards the sun, and lower when it is not. Solar panels can be mounted in various ways to ensure maximum exposure of the PV panels to sunlight. In order to optimise the energy produced by the PV modules versus the cost of the infrastructure, it is proposed to install tracking systems (either single axis or dual axis).

In a fixed angle system the PV panels are installed at a set tilt and cannot move, whereas in a single axis tracking system the panels follow the sun's vertical or horizontal movement. Dual axis tracking follows both the vertical and horizontal movements to ensure maximum exposure to sunlight. The potential differences in power generation of these alternatives are indicated in Figure 3-16. Dual axis tracking is the best option in terms of generation as it can take advantage of early morning and late afternoon sun positions.

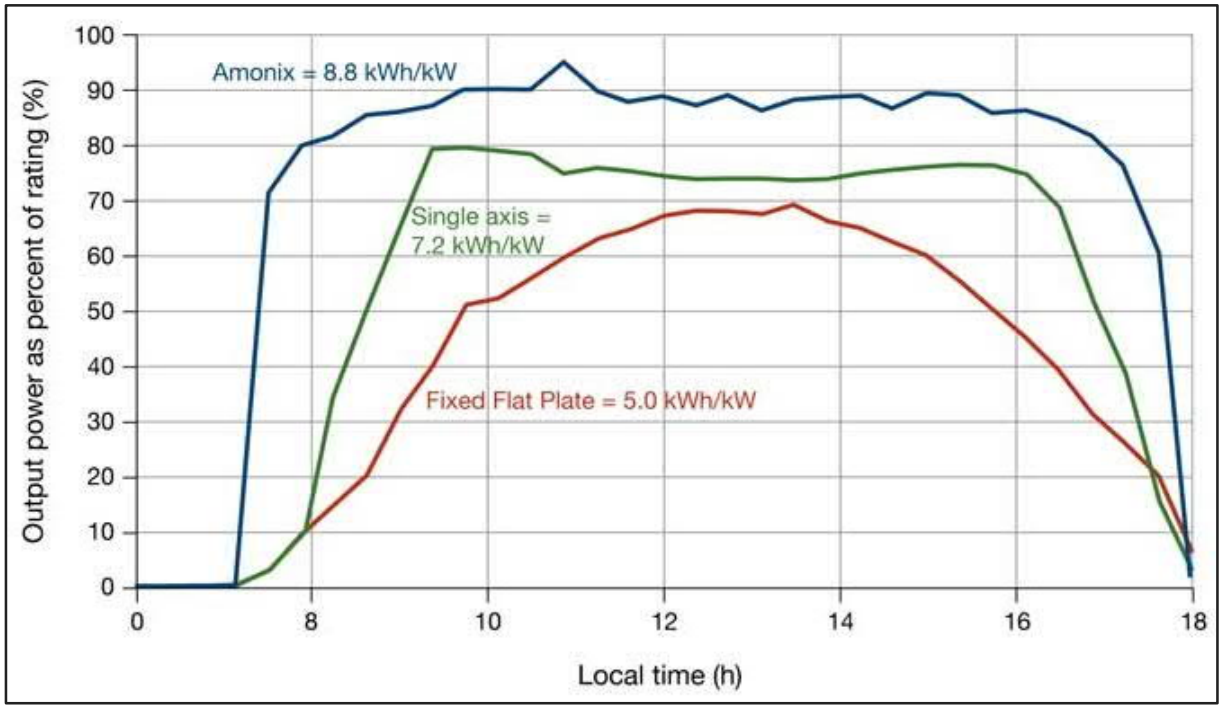


Figure 3-16 | Comparison of output power of fixed, single and dual axis tracking systems (Smith, 2011)

Fixed angle and single axis tracking systems have similar heights at approximately 4 m above the natural ground level, while dual axis tracking systems could be up to 8 m above the natural ground level, increasing their visual presence.

A single axis tracking system is proposed for this project. It produces an energy output approximately 20% higher than the fixed angle system, requiring fewer panels than a fixed system. It also produces more energy in the early mornings when the peak tariff is used but is not as complex and costly as a dual axis system, and it does not have the visual impacts associated with the taller structures of a dual axis tracking system.

Figure 3-17 | Single axis tracking system[11] (left) versus a fixed axis system (right)

From an environmental perspective, a single axis tracking system is preferred for this application, since it had a lower visual impact than a dual axis tracking system, but it has a higher output than a fixed angle system.

[11] Source: http://www.archiexpo.com/prod/sunpower/single-axis-solar-trackers-pv-installations-54500-501032.html

3.7.3 Routing Alternatives for powerlines within corridors

Two 132 kV transmission lines are required to transmit the generated power from the solar PV plant to the mine. Two transmission line corridors for each alternative were identified within a 200m wide assessment corridor. Each corridor has been given a 200m width to ensure that the approved corridor is sufficient for the final micro-siting of pylons to navigate topography and identified sensitivities. These corridors will also be informed by the specialist assessment findings during the EIA phase. Therefore, it is currently requested that a 200m wide corridor be approved together with the preferred site.

When considering alternatives sites, it is important to keep in mind that shorter distances are preferred when transmitting energy as longer transmission lines result in larger transmission losses. Besides increasing the cost, longer transmission lines disturb a larger area of the environment as more pylon structures are required. Thus, the disturbed footprint area and impacts on birds is potentially larger with longer transmission lines.

3.7.4 No-Go Alternative

In addition to the preferred alternative, the No-Go alternative will also be assessed during the EIA Phase. The No-Go option means the *status quo* remains. That means the current game farming would remain and continue at the site.

The No-Go alternative serves as a basis for comparison and can serve to validate the need and desirability for the project. The assessment of alternatives must at all times include the consideration of the No-Go option as a baseline against which all other alternatives must be measured.

3.7.5 Conclusions on Alternatives

In summary, the following alternatives have been identified:

- Location alternatives: The Drumsheugh (Site 1, southern parcel) is the preferred site. The Regina (Site 2, northern parcel) is the alternative site. Although both sites fall within protected and sensitive areas, neither of these sites have any environmental or social fatal flaws. Thus, the decision of preferred site is based primarily on technical factors and proximity to the locations where electricity will be used (i.e. to the mine).
- Technology alternatives (Mounting alternatives):
    - The mounting alternatives considered are fixed angle, single axis tracking and dual axis tracking.
    - Single-axis tracking is preferred, since it produces an energy output approximately 20% higher than the fixed angle system, requires fewer panels than a fixed system (thus reducing its footprint) and it produces more energy in the early mornings when the peak tariff is used, but is not as complex and costly as a dual axis system. It has a further advantage that its visual impacts are lower than dual axis tracking system, which has twice the height of a single axis tracking system.
- Routing Alternatives for powerlines within corridors
    - As indicated above in this report, two transmission routes per project site have been identified. These routes will both be required for the approved project site and are not regarded as alternative to one another. The preferred site requires approximately 5.8 km servitudes for the two transmission lines while site 2 will require around 15.4 km servitudes.
    - Corridors of 200m wide have been identified for both routes for each of the two alternative sites. Based on the findings of the specialist studies during the EIA phase, adjustments of the routes within the preferred corridors will be considered to minimise and avoid environmental and social sensitivities.

- The No-Go alternative:
  - Based on current information, neither of the alternative sites (including the associated transmission line corridors) nor the transmission line corridors have any environmental fatal flaws or significant red flags.
  - The project is designed to reduce Venetia mine's reliance on grid-based electricity, which is primarily generated from coal-fired Eskom power stations. The project has several potential environmental and socio-economic benefits, including improving the mine's cost energy predictability, community beneficiation, reduced carbon and improved energy security for the mine (thus enhancing the potential to extend the life of mine and provide lasting socio-economic benefits to employees and the community) and improved Mining Charter compliance.
  - Therefore, from environmental and social perspectives, there is no reason to consider the no-go alternative.

4 IDENTIFICATION OF POTENTIAL IMPACTS

This chapter contains detailed assessments of potential social and environmental impacts (positive and negative) associated with the proposed project and associated infrastructure that were identified during the screening process as described in Section 3. The Methodology that was used, is described in the Plan of Study for EIA in Annexure G. Issues raised by I&APs during the Public Participation Process will be considered for the identification of additional potential impacts to be investigated and assessed during the EIA Phase. Contributors to this chapter are listed in Table 4-1. All specialist reports are in Annexure E.

During the screening process various potential impacts on the biophysical and socio-economic environment were identified by the specialists and the EAP, namely:

- Impact on terrestrial biodiversity, including animals (birds and bats) and plants;
- Impact on aquatic biodiversity;
- Impact on climate change;
- Impact on heritage resources, including archaeological and palaeontological (fossil) resources;
- Impact on the social environment, including expectations for local employment and procurement and socio-economic development;
- Air quality (dust) impacts during construction;
- Traffic impacts during construction;
- Noise impacts during construction; and
- Visual impacts during construction and operation.

Specialist assessments and site visits have been undertaken for these impacts and the findings thereof are presented in the sections to follow. These specialist reports and associated CVs are included in Annexure E.

All of the above-mentioned impacts could potentially occur throughout the construction, operational and decommissioning phases of the project and are described in the sections below.

Table 4-1 | Specialist studies undertaken to date

Potential Impact	Assessment	Specialist
Impact on biodiversity (fauna, birds, bats, flora, and aquatic systems)	Biodiversity Impact Assessment	Greenthorn Consulting
Impact on heritage and palaeontological resources	Heritage and Palaeontological Impact Assessments	Millennium Heritage Group
Social impacts	Qualitative Social Impact Assessment in Scoping Report	Equispectives Research and Consulting Services
Storage of hazardous substances on site	Qualitative Contamination Impact Assessment in Scoping Report	Zutari - EAP
Noise	Qualitative Noise Assessment in Scoping Report	DB Acoustic Consulting
Visual / Landscape	Visual Desktop Assessment	Create landscape architecture

These impacts on the environment will be assessed, in terms of the requirements of Annexure 2 of the EIA Regulations, 2014, and according to the Zutari Impact Assessment Methodology contained in Annexure G of the Scoping Report. For each impact assessed, mitigation measures have been proposed to reduce and/ or avoid negative impacts and enhance positive impacts. These mitigation measures will be incorporated into the EMPr during the EIA Phase to ensure that they are implemented during the planning, construction, operational and decommissioning phases of the proposed project. The EMPr would become a legally binding document should this project receive environmental authorisation.

In addition to the above-mentioned specialist studies, additional studies may be required to address comments from Interested and Affected Parties (I&APs), commenting authorities or the LEDET on the Scoping Report and Plan of Study for EIA. Such additional studies will be undertaken during the EIA Phase and included in the EIR.

4.1 IMPACT ON TERRESTRIAL AND AQUATIC BIODIVERSITY AND PROCESSES

GreenThorne was appointed to conduct an ecological assessment covering terrestrial and aquatic environments. The findings of this assessment are summarized in the sections below. For the full assessment of terrestrial and aquatic biodiversity, refer to Annexure E4.

4.1.1 Description of the Baseline Conditions

The mining operation is situated within the Musina Local Municipality and in the Vhembe District Municipality. The mining right area of Venetia Mine is approximately 3 000ha and the VLNR approximately 36 000ha. Both these areas fall within the buffer zone of the Mapungubwe Cultural Landscape World Heritage Site (MCLWHS) which is located within the Mapungubwe National Park which is under the management of South African National Parks (SANParks).

4.1.1.1 Climate

Summer rainfall with very dry winters including the shoulder months of May and September. Mean annual precipitation (MAP) about 300-400 mm. Generally frost-free unit. Mean monthly maximum and minimum temperatures for Macuville-Agr (northwest of Musina) 39.9ºC to 0.9ºC for November and June, respectively (Mucina & Rutherford, 2006).

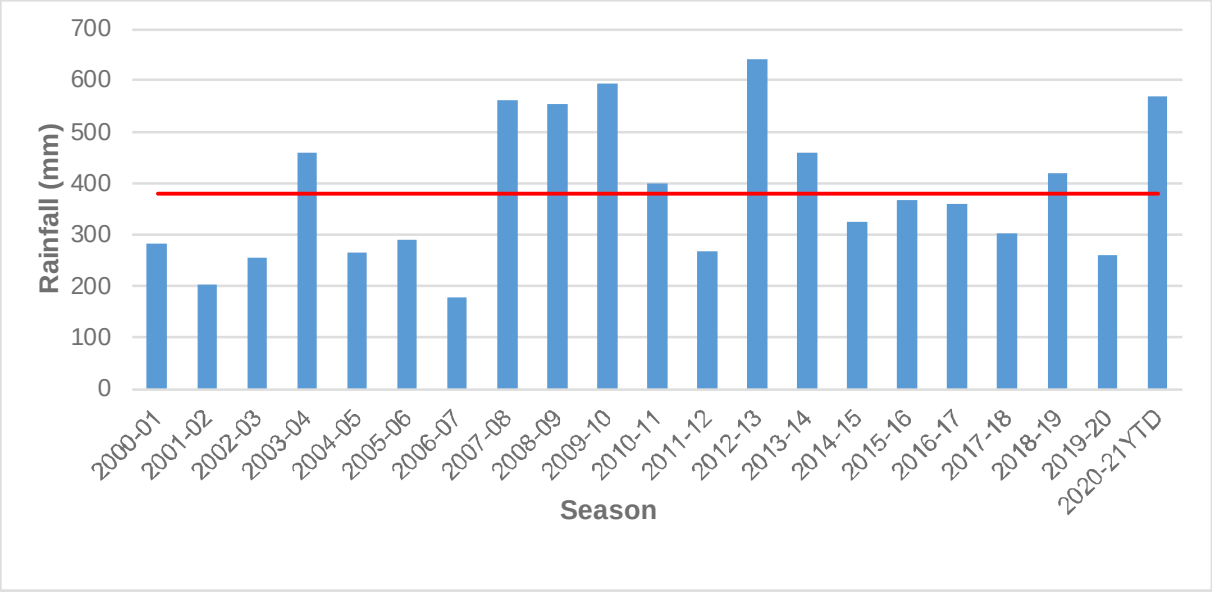


Figure 4-1: Venetia Mine Seasonal Rainfall 2000-2021 YTD

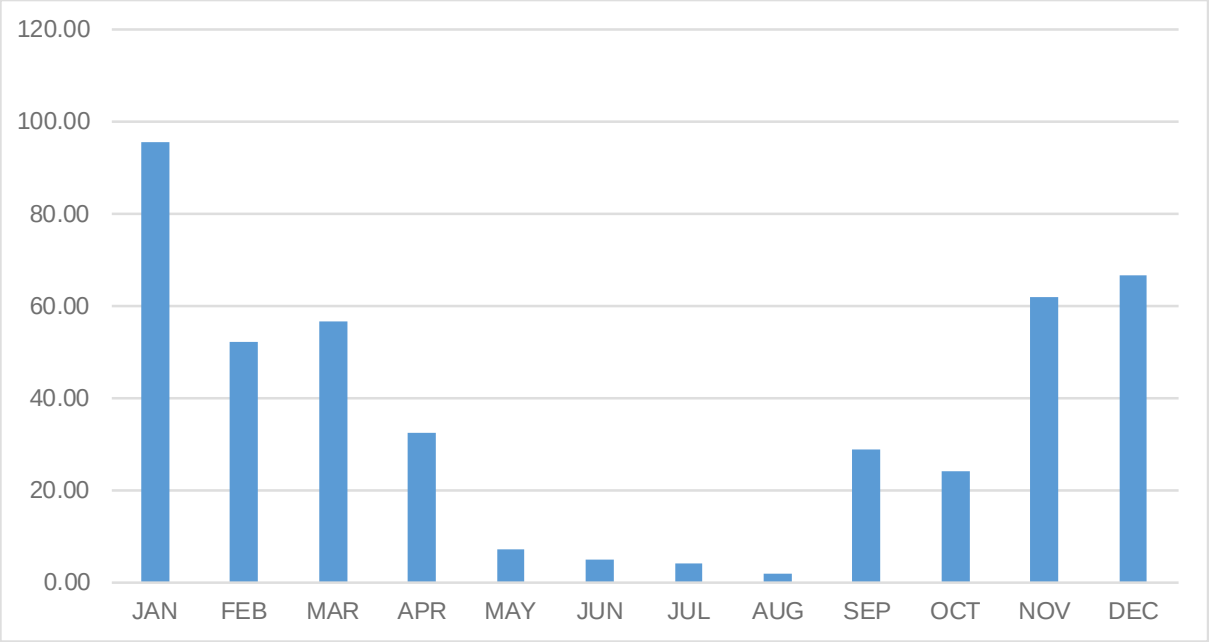


Figure 4-2: Venetia Mine 23 Year Average Monthly Rainfall (mm per month)

4.1.1.2 Topography and drainage

The local topography consists of low hills and wide valleys varying in elevation from 600 metres at the valley bottom to 710 metres at the hill peaks in the south, above mean sea level. As for the mining area the surface topography and associated landscape has been and will further be altered by mining activities until the end of life of mine. The greater area is drained by various drainage lines feeding into the Setonke and Kolope Rivers that feed into the Limpopo River.

4.1.1.3 Geology and soils

The mining right area (within which the proposed PV Solar project is situated) is underlain by the Archaean Beit Bridge Complex, except where it is covered by much younger Karoo sandstones and basalts. The Beit Bridge Complex consists of gneisses and metasediments and is structurally very complex. In summary, the geological and geomorphological history of the area has resulted in a relatively complex mosaic of rock and soil types within a relatively small area.

The soils of the larger area vary a lot due to the complex geology of the area, however, for the study area the soils are deep red eutrofic apedal loamy coarse sand to coarse sandy loam which can be classified as Shigalo, Portsmouth, Shorrocks and Glenrosa.

4.1.1.4 Vegetation

The mine is situated in the Savannah Biome. Mucina and Rutherford (2006) described the general vegetation type present on the site as Mopane Veld. The two main ecological vegetation types in the area are Limpopo Ridge Bushveld (SVmp 2) and Musina Mopane Bushveld (SVmp 1). The dominant vegetation species associated with SVmp 1 are: Tall trees: *Senegalia nigrescens, Adansonia digitata, Sclerocarya birrea* subsp. *caffra.* Small trees: *Colophospermum mopane, Combretum apiculatum, Senegalia senegal* var. *leiorhachis, Vachellia tortilis* subsp. *heteracantha, Boscia albitrunca, Boscia foetida* subsp. *rehmanniana, Commiphora*

glandulosa, Commiphora tenuipetiolata, Commiphora viminea, Sterculia rogersii, Terminalia prunioides, Terminalia sericea, Ximenia americana. Tall shrubs: *Grewia flava, Sesamothamnus lugardii, Commiphora pyracanthoides, Gardenia volkensii, Grewia bicolor, Maerua parvifolia, Rhigozum zambeziacum, Tephrosia polystachya.* Low shrubs: *Acalypha indica, Aptosimum lineare, Barleria senensis, Dicoma tomentosa, Felicia clavipilosa* subsp. *transvaalensis, Gossypium herbaceum* subsp. *africanum, Hermannia glanduligera, Neuracanthus africanus, Pechuel-Loeschia leubnitziae, Ptycholobium contortum, Seddera suffruticosa.* Succulent shrub: *Hoodia currorii subsp. lugardii. Herbaceous climber: Momordica balsamina. Graminoids: Schmidtia pappophoroides, Aristida adscensionis, Aristida congesta, Bothriochloa insculpta, Brachiaria deflexa, Cenchrus ciliaris, Digitaria eriantha* subsp. *eriantha, Enneapogon cenchroides, Eragrostis lehmanniana, Eragrostis pallens, Fingerhuthia africana, Heteropogon contortus, Sporobolus nitens, Stipagrostis hirtigluma* subsp. *patula, Stipagrostis uniplumis, Tetrapogon tenellus, Urochloa mosambicensis*. Herbs: *Acrotome inflata, Becium filamentosum, Harpagophytum procumbens* subsp*. transvaalense, Heliotropium steudneri, Hermbstaedtia odorata, Oxygonum delagoense.* Succulent herbs: Stapelia gettliffei, Stapelia kwebensis.
The dominant vegetation species associated with SVmp 2 are: Tall trees: *Adansonia digitata, Senegalia nigrescens, Sclerocarya birrea subsp. caffra. Small trees: Colophospermum mopane, Commiphora glandulosa, Commiphora tenuipetiolata, Terminalia prunioides, Senegalia senegal var. leiorhachis, Vachellia tortilis subsp. heteracantha, Boscia albitrunca, Combretum apiculatum, Combretum imberbe, Commiphora mollis, Ficus abutilifolia, Ficus tettensis, Kirkia acuminata, Sterculia rogersii, Ximenia americana*. Tall shrubs: *Catophractes alexandri, Commiphora pyracanthoides, Gardenia resiniflua, Grewia bicolor, Grewia villosa, Hibiscus calyphyllus, Hibiscus micranthus*. Low shrubs: *Barleria affinis, Blepharis diversispina, Neuracanthus africanus, Plinthus rehmannii, Ptycholobium contortum.* Woody climber: *Cissus cornifolia. Graminoids: Aristida adscensionis, Aristida stipitata subsp. graciliflora, Digitaria eriantha subsp. eriantha, Enneapogon cenchroides, Panicum maximum, Schmidtia pappophoroides, Stipagrostis uniplumis.* Succulent herb: *Tavaresia barklyi.*

4.1.1.5 Fauna

Due to the regional complexity of the area in terms of geological and vegetation intra associations the area also supports a diverse faunal population that contribute to overall biodiversity. Species lists were developed for the area and aims to provide insight into the possible occurrence of species within the study area and subsequently provide guidance for field verifications. These lists are included under Appendix A, B, C, D of the Biodiversity assessment.

4.1.2 Assessment of Potential Impacts, including cumulative impacts and the no-go alternative

The habitat will be investigated by noting habitat structure (rockiness, slope, plant structure/physiognomy) as well as floristic composition. Voucher specimens of plant species will only be taken where the taxonomy was in doubt and where the plant specimens were of significant relevance for invertebrate conservation. Field guides such as those by Germishuizen (2003), Manning (2003), Manning (2009), Van Oudtshoorn (1999), Van Wyk (2000), Van Wyk & Malan (1998) and Van Wyk & Van Wyk (1997) will be used to confirm the taxonomy of the species. Works on specific plant groups (often genera) such as those by Goldblatt (1986), Goldblatt & Manning (1998), Jacobsen (1983), McMurtry, Grobler, Grobler & Burns (2008), Smit (2008), Van Jaarsveld (2006) and Van Wyk & Smith (2003) will also be consulted to confirm the identification of species. For the most recent treatise of scientific plant names and broad distributions, Germishuizen, Meyer & Steenkamp (2006) will be followed to compile the lists of species.

4.1.2.1 Potential impact on terrestrial and aquatic biodiversity and processes

The level of impacts of the proposed solar PV facility will depend on the proposed layout. At the current stage of planning, detailed layouts are not available, and the potential impacts cannot be confirmed. Depending on the areas to be developed, the impacts may differ from highly significant to insignificant. These impacts could include the following:

- Loss of floral and faunal habitat;
- Loss of floral and faunal diversity;
- Impact on floral and faunal species of conservation concern;
- Increased sedimentation of watercourses due to soil erosion; and
- Impact of glare on bird species.

4.1.2.2 Impact of the no-go alternative

If the no-go alternative is developed, all potential biodiversity impacts at the proposed site due to the proposed project will be avoided. However, the no-go alternative would have the disadvantage of not delivering renewable power to the Venetia Mine and not reducing its carbon footprint.

4.1.2.3 Cumulative impacts

One other renewable energy application (and various amendment applications for the same project) has been authorised within 20km of the proposed site. Based on their locality, limited size (maximum 75 MW) and intervening topography and infrastructure, cumulative impacts are expected to be low to negligible. However, the current impact of the Venetia Mine must be taken into account. The cumulative impacts include the physical footprint of disturbance related to the mine being extended by the size of the proposed project. On the other hand, the carbon footprint of the mine will be improved by making use of renewable energy instead of energy produced by coal-fired power stations.

4.1.3 Proposed Mitigation Measures for terrestrial habitats

Detailed mitigation measures will be determined during the EIA phase assessment, once the detailed layout of the proposed PV plant development is known. The proposed mitigation measures listed below are generic measures.

4.1.3.1 Construction Phase Generic Mitigation Measures

- It must be ensured that, as far as possible, all proposed infrastructure is placed outside of any sensitive habitat areas that may be identified during the biodiversity assessment. Where this is not possible, suitable mitigation measures must be implemented.
- The construction footprint must be kept as small as possible to minimise the impact on the surrounding habitat.
- The construction footprint shall be demarcated to ensure that all construction activities remain within this footprint.
- Areas of increased ecological importance and sensitivity, including wetland areas, shall be considered during all phases of the development planning and construction. Highly sensitive areas outside the development footprint shall be demarcated as no-go areas.
- Disturbance to important avifaunal habitat, e.g. wetlands and watercourses must be minimised by ensuring that, as far as possible, all development infrastructure is placed outside of sensitive areas.
- Planning of temporary roads and access routes should consider the ecological site sensitivities. As far as possible, pre-existing roads must be used, whilst new roads must avoid any wetland and water systems.

- Restrict vehicles to travelling only on designated roadways to limit the disturbance footprint of the proposed PV facility.
- Manage edge effects to ensure further loss of faunal habitat does not occur in the surrounding areas.
- Proliferation of alien and invasive species is expected within any disturbed areas. These species must be eradicated and controlled to prevent their spread beyond the development area.
- Starting fires in the vicinity of development area must be prohibited.
- No trapping or hunting of fauna shall be allowed to take place.
- It must be ensured that storm water is managed on site in a suitable manner, as per a stormwater management plan and EMPr., so that runoff does not cause excessive erosion.
- Avoid disturbance of moderately to highly sensitive habitat units as far as possible. Where this is not possible, a rescue and relocation plan must be implemented prior to construction. It must also be ensured that the disturbance footprint must be minimised and any disturbed areas must be rehabilitated.
- Ensure that the proposed development footprint area remain as small as possible.
- Prohibit the collection of plant material for firewood or for medicinal purposes.
- Prohibit the collection of plant material for medicinal purposes.
- All soils compacted as a result of construction activities falling outside of the footprint area should be ripped and profiled.
- Powerline crossings and tower footprints should not encroach upon any wetland temporary zone boundaries and associated buffers.
- Should any SCC or other protected plant species be encountered within the subject property in the future, the following should be ensured:
    - If any threatened species will be disturbed, ensure effective relocation of individuals to suitable offset areas (of similar habitat in close proximity to where species were removed from, but outside the disturbance footprint); and
    - All rescue and relocation plans should be overseen by a suitably qualified specialist.

4.1.3.2 Operational Phase Generic Mitigation Measures

- All disturbed areas must be suitably rehabilitated with locally indigenous plant species or as required by a rehabilitation specialist.
- Operational activities must be restricted to the development footprint.
- An alien and invasive vegetation control plan should be developed and implemented throughout the operational phase of the proposed PV facility.
- Vehicles must be restricted to travelling only on designated roadways to limit the disturbance footprint.
- No dumping or waste disposal shall occur on the site.

4.1.4 Proposed Mitigation Measures for Aquatic Habitats

4.1.4.1 Construction Phase Generic Mitigation Measures

- The development footprint area shall be limited to what is absolutely essential in order to minimise environmental damage. Construction vehicles must use existing roads where possible.
- During construction, the storage of building materials shall be kept out of the wetlands and watercourses.
- All waste and remaining building materials shall be removed from site on completion of the project and not dumped wetlands or watercourses.
- No vehicles shall be allowed to indiscriminately drive through wetlands or watercourses.

- The duration in which soils are exposed during construction activities shall be kept as short as possible to prevent erosion or dust which can cause sedimentation of neighbouring wetlands or watercourses;
- Concurrent rehabilitation is to take place as far as possible.
- Should sediment be deposited in the wetlands or aquatic systems, the following intervention could be considered or a site specific erosion management plan shall be developed by a suitably qualified specialist:
- Straw barriers shall be installed in drainage paths to act as a check dam, i.e. to reduce velocity, and as a sediment trap during construction (Figure 4-3). These erosion barriers shall be placed at intervals of 25-50m apart in the drainage paths to intercept suspended solids from entering the natural drainage paths.

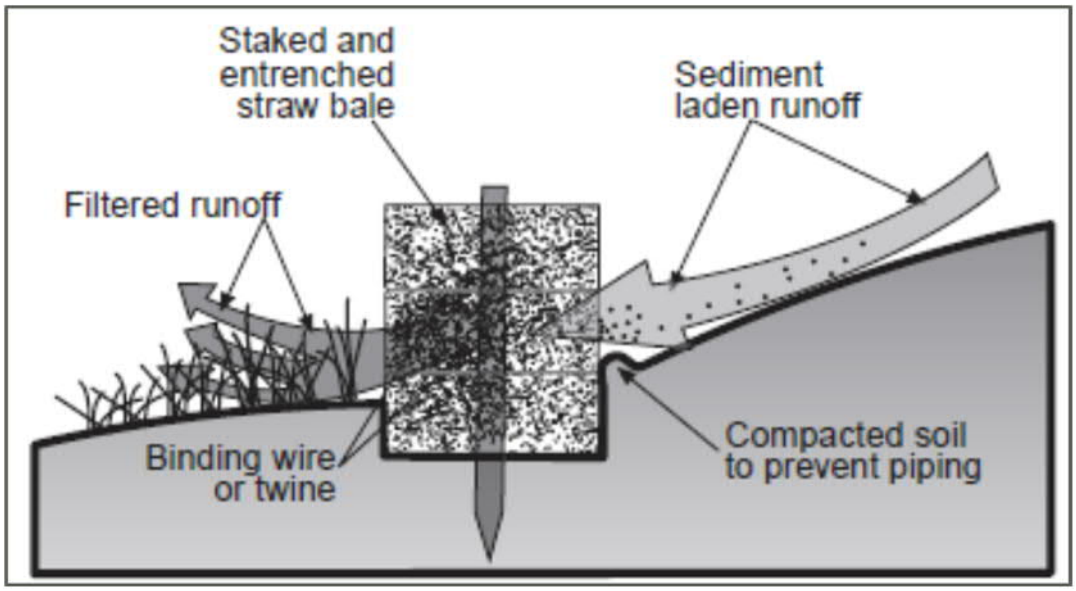


Figure 4-3: Cross-sectional view of an installed straw bale

4.1.4.2 Operational Phase Generic Mitigation Measures

- Any area where active erosion is observed must be immediately rehabilitated in such a way as to ensure that the hydrology of the area is re-instated to conditions which are as natural as possible.
- If necessary, an erosion management plan should be developed by a suitably qualified specialist for implementation during operation.

4.1.5 Conclusion

Based on current information, there are no fatal flaws or significant red flags that would prevent the use of either site and its associated transmission line corridors for an SEF. Detailed assessments during the EIR phase will provide further information to confirm the biodiversity constraints on the site, and in particular the conservation status and importance of the terrestrial aquatic systems in the CBA 2 area within which Site 1 is located.

4.2 IMPACT ON HERITAGE RESOURCES

Millenium Heritage Group was appointed to conduct the Heritage Impact Assessment for the proposed project. The findings of this assessment are summarized in the sections below. For the full assessment, refer to Annexure E2.

4.2.1 Description of the Baseline Conditions

4.2.1.1 Regional History

Archaeological research within the Limpopo Valley, Venetia Mine, and the Venetia Limpopo Nature Reserve, paints a picture of the general layers of occupations, this encompasses different phases of the Stone Age period. Conventionally speaking, the Stone Age period has been divided into the Early Stone Age (ESA) (3.5 million and 250 000 BP), the Middle Stone Age (MSA) (250 000 – 25000 BP) and the Later Stone Age (25000 – 2000 BP) (Phillipson 2005). Early Stone Age stone tool assemblages are made up of the earlier Oldowan and later Acheulian types. The Oldowan tools were very crude and were used for chopping and butchering. These were replaced by Acheulian ESA tools dominated by hand axes and cleavers which are remarkably standardized (Wadley, 2007; Sharon, 2009). Evidence presented from Makapansgat caves shows that the first tool-making hominids belong to either an early species of the Homo or an immediate ancestor which is yet to be discovered here in South Africa (Phillipson 2005; Esterhuysen, 2007). Both the Oldowan and Acheulian industries are well represented in the archaeology of northern South Africa as shown by studies in the Makapansgat valley (Kuman et al. 2005; Sumner and Kuman 2014).

The Middle Stone Age dates to between 250 000 ago and 25 000 years ago. In general, Middle Stone Age tools are characterized by a size reduction in tools such as hand axes, cleavers, and flake and blade industries. The period is marked by the emergence of modern humans and was accompanied by change in technology, behaviour, physical appearance, art, and symbolism (Phillipson 2005). A variety of MSA tools includes blades, flakes, scraper and pointed tools that may have been hafted onto shafts or handles and used as pear heads. Surface scatters of these flake and blade industries occur widespread across southern Africa (Klein, 2000; Thompson & Marean, 2008).

Residue analyses on some of the stone tools indicate that these tools were certainly used as spear heads (Wadley, 2007). From about 25 000 BP, stone tool assemblages generally attributed to the Later Stone Age emerged. This period is marked by a further reduction in stone tool sizes. Typical stone tools include microliths and bladelets. Later Stone Age stone tools were recovered in the Soutpansberg and well known sites of the Mapungubwe National Park. This period is also associated with the development of rock art whose distribution is known across southern Africa (Deacon and Deacon 1999; Phillipson 2005).

4.2.1.2 Site-specific Heritage Features

This cultural landscape is an archaeologically layered scenery with the Mapungubwe National Park declared a World Heritage site in 2003 (Deacon and Norton, 2003). Apart from Stone Age period sites, the cultural landscape host various layers of human occupation dating back the first Millenium AD, corresponding to the Early Iron Age farmers in the region (Huffman 2007). This layer is followed by the Middle Iron Age associated with the state capitals at Schroda, K2 and Mapungubwe. After this various groups (Khami–Venda) and (Sotho-Tswana) settled in the area during the Late Iron Age.

The last layers relate to colonial history and the early history of the twentieth century. The material signatures for all these cultural periods have been identified in the Mapungubwe cultural landscape as broadly defined (Huffman 2007) and collectively convey its significance (Deacon and Norton 2003).

Huffman's work on the VLNR and adjacent areas identified many sites, few of which are on the southwestern side of the farm Endora 66MS, along the Kolope River. Other sites were recovered on the farm Venetia 104MS but none on Krone 104MS (Huffman 2011).

Current knowledge suggests that the Limpopo Valley has attracted farming communities who were also interacting with hunter-gatherers. Some of the sites of interaction were used for rain making and rain control. This landscape therefore is associated with scientific, historical, cultural, scientific and aesthetic values (Siyathembana, 2017).

The desktop studies also involved a review of HIA reports (Huffman 2010; Pistorius 2011, Siyathembana 2012, 2017) and monitoring reports within and around Venetia Mine and the VLNR and in Mapungubwe National Park (Siyathembana 2017, Mathoho & Chirikure 2020). Stone Age, Iron Age and historical sites were acknowledged by Hanisch (1979), Huffman (2010), Pistorius (2011), and Siyathembana (2012). Based on a desktop study only one iron age site has been identified south of the Farm Drumheugh farm towards the Kalope River bank. Based on the physical site demarcation, this site will not be disturbed by the proposed solar PV facility within the VLNR.

Figure 4-4 indicates the desktop results of historical sites known and documented in and around the study area.

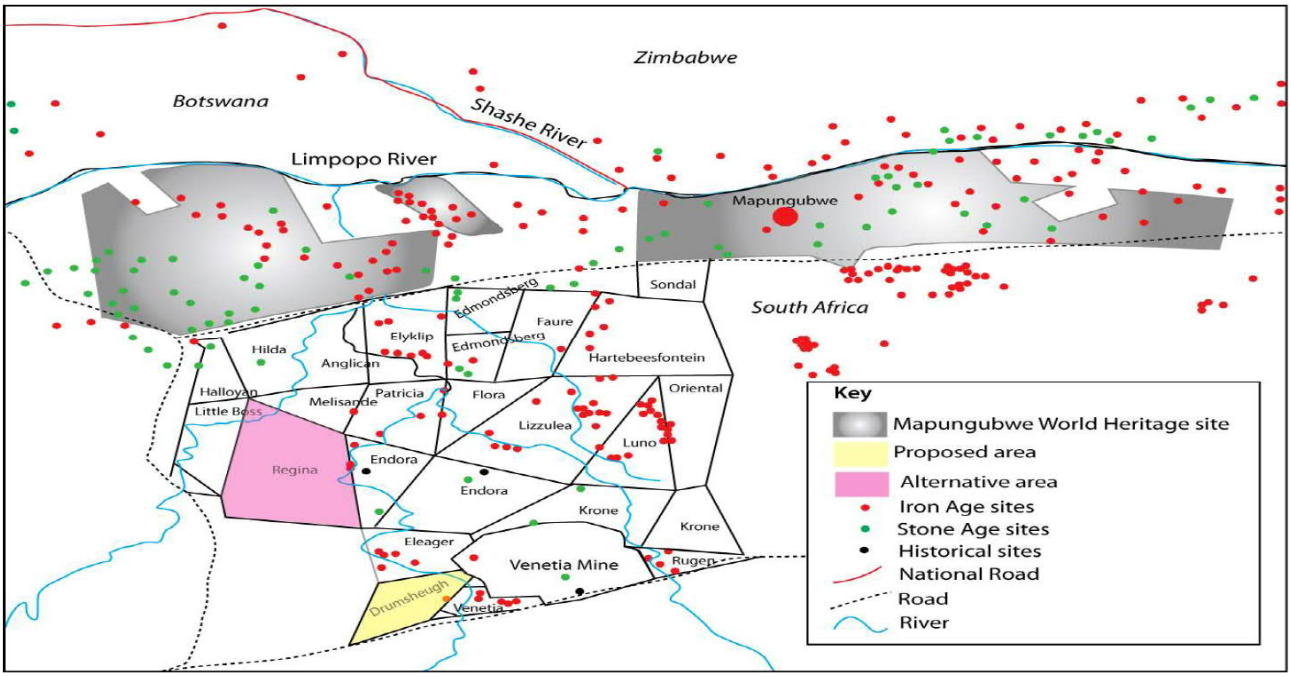


Figure 4-4: Archaeological and historical sites distribution map within the study area and the rest of the Limpopo River Valley

4.2.2 Assessment of Potential Impacts, including cumulative impacts and the no-go alternative

4.2.2.1 Potential destruction of graves

Based on current knowledge, there are no known graves on either of the alternative sites. The heritage specialist will conduct a field assessment of the site to determine if any graves are present and in danger of being affected by the proposed development.

4.2.2.2 Potential destruction of significant heritage resources

While no resources of significance were found during the desktop assessment, the field assessments to be conducted by the heritage specialist will confirm whether any artifacts or heritage resources older than 60 years will be impacted upon by the proposed development.

4.2.2.3 Impact of the no-go alternative

Should the no-go alternative be approved, potential impacts on possible graves and heritage sites could be avoided. However, these are speculative impacts as the desktop assessments revealed no sites of cultural or heritage significance in these proposed areas. The impacts will need to be confirmed through assessments in the EIA phase. Unless the presence of graves is confirmed, the no-go alternative would currently have no advantage over the alternative of developing the project.

4.2.2.4 Cumulative impacts

At the time of preparing this Scoping Report, one other renewable energy application (and various amendment applications for the same project) had been authorised within 20km of the proposed site. Based on their locality, limited size (maximum 75 MW) and intervening topography and infrastructure, cumulative heritage impacts are expected to be negligible.

4.2.3 Proposed Mitigation Measures

Proposed mitigation measures will be dependent on the findings of the field assessments to be conducted. However, should any sites of significance be observed, the following measures may be required to be implemented:

- All identified heritage resources sites must be recorded with a geospatial location point. These sites should be considered during the more detailed design phase to avoid the sites and their buffer zones as far as possible.
- Where these sites can be avoided, they must be fenced off as a no-go area to avoid any disturbance during construction.

A chance finds protocol should also be included in the EMPr to instruct the contractor on measures to be followed should a heritage artifact by found during construction.

4.2.4 Conclusion

In conclusion, the only heritage feature identified in proximity to the proposed power line route between Site 1 and the mine is a concrete reservoir on the southern section of the Kolope non-perennial stream. This infrastructure is older than sixty years and qualifies to be protected in terms of the National Heritage Resources Act 25 of 1999, and may not be demolished, altered, renovated or removed without a permit from the SAHRA. This feature can be avoided during micro-siting of the pylon positions within the 200m corridor. There are no known heritage sites within the proposed SEF development area.

An Iron Age site is known to be located south east of the Farm Drumsheugh. Based on the mapped SEF footprint, this iron Age site is situated outside the project footprint.

4.3 IMPACTS ON PALAEONTOLOGICAL RESOURCES

Millenium Heritage Group (Pty) Ltd appointed Dr Durand, a palaeontological specialist, to conduct a palaeontological assessment of the proposed site. The findings of this assessment are summarized in the sections below. For the full assessment of social impacts, refer to Annexure E8.

4.3.1 Description of the Baseline Conditions

South Africa's unique and non-renewable palaeontological heritage is protected in terms of the NHRA. According to this act, heritage resources may not be excavated, damaged, destroyed or otherwise impacted by any development without prior assessment and without a permit from the relevant heritage resources authority.

The study site is situated in an area covered in sandy soil and mopane veld and is situated west-southwest of Venetia Mine (see Figure 4-4).

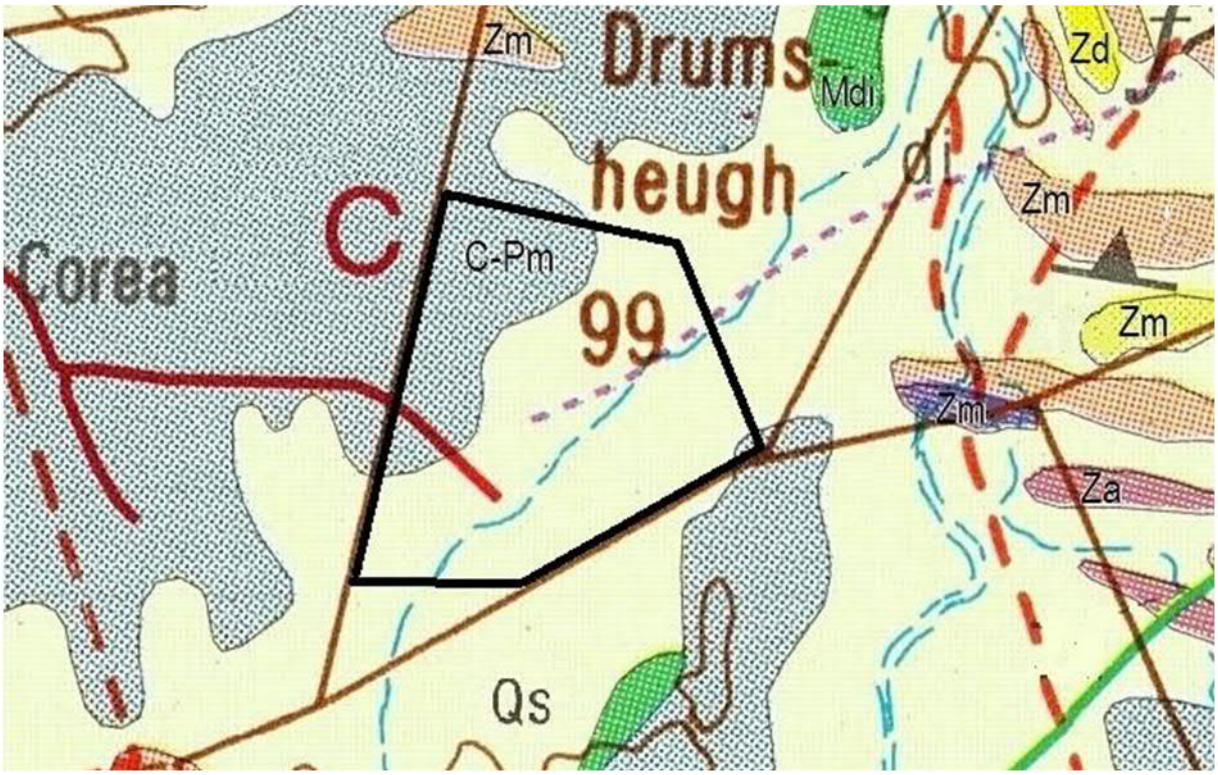


Figure 4-5: Geological Map of the study area and surroundings. Adapted from the 2228 ALLDAYS 1: 250 000 Geology Map (Council for Geoscience, 2000). The study area is indicated by the black polygon line.

Table 4-2: Lithology legend to translate the geological map above

	Lithology	Stratigraphy		Age
Qs	Sandy soil			Quaternary
C-Pm	Mudstone, shale, carbonaceous shale, sandstone, conglomerate, coal seams, diamictite	Madzaringwe & Mkambeni Formations		Carboniferous / Permian
Mdi	Diabase			Mokolian
Za	Dark to light-grey to pink in places porhyroblastic biotite gneiss	Beitbridge Complex	Alldays Gneiss	Swazian
Zm	Leucocratic quartzo-feldspathic gneiss, in places garnetiferous		Malala Drift Group	
Zm	Leucocratic quartzo-feldspathic gneiss, metaquartzite			
Zm	Leucocratic quartzo-feldspathic gneiss, metapelite			
Zd	Metaquartzite, minor magnetite quartzite and massive magnetite		Mt Dowe Group	

The igneous and metamorphic rocks of the Limpopo Metamorphic belt were overlain by Karoo sediments from approximately 240 million years ago. Subsequently, after the break-up of Gondwana, the Karoo layers were significantly reduced due to erosion, which in places exposed the older non-fossiliferous rock strata, as is the case in the study area. Some pockets of Karoo sediments which may be fossiliferous, remain to the south of the Tuli Basin.

The Main Karoo Basin, which covers more than 50 % of the surface of South Africa, can be subdivided into the Dwyka, Ecca and Beaufort Groups. The layers overlying the Beaufort Group can be subdivided into the Molteno, Elliot and Clarens Formations which are in turn overlain by the Drakensberg Basalts (Johnson *et al*., 1996).

In the northern part of the Limpopo Province and in Mpumalanga the Karoo Supergroup is much attenuated and incomplete compared to the Main Karoo Basin to the south. The Karoo-aged rocks occur mainly in two areas in the Limpopo Province named the Tuli and Tshipise Basins, with minor outliers between them. The study area lies on the southern edge of the Tuli Basin. The geology of this region is dominated by sedimentary rock with some occurrences of igneous rocks.

The sedimentary sequences of the Tuli Basin were set down on top of the Beit Bridge gneisses in a small intercratonic graben-type depression before the break up of Gondwanaland (Brandl, 2002). The basal Karoo sediments in the Tuli Basin, known as the Tshidzi Formation, consist of angular blocks and fragments derived mainly from much older underlying strata imbedded in coarse sand and grit. These diamictite deposits are overlain by channel deposits in the form of coarse reddish micaceous grits which pass upward into the laminated shale of the Madzaringwe Formation.

The Madzaringwe Formation consists primarily of shales with occasional lenses of red and yellow grits in the lower sequences. Higher up in the sequence the shales alternate rhythmically with coal seams which constitute a 20 m thick coal zone. The model which best describes the processes responsible for such a sequence would be a marsh that was periodically flooded. If this model is correct the coal consists primarily from autochthonous plant material as would be suggested by the occurrence of root impressions and *Vertebraria* fossils (Van den Berg, 1980). The top of the Madzaringwe Formation is marked by point bar and channel-lag deposits forming a coarse micaceous sandstone layer which may be up to 10m thick (Brandl, 2002).

The Mikambeni Formation consists of shales and siltstones identical to those forming the Madzaringwe Formation. This 15m thick sequence was formed in a shallow lacustrine environment. This sequence contains carbonaceous shales and small coal seams in places. *Glossopteris* fossils are found in a buff-coloured siltstone unit near the top of the Mikambeni Formation (Brandl, 2002). The *Glossopteris* fossils indicate a Middle Ecca age (Kovacs-Endrödy, 1983).

It seems as if the Beaufort Group (Late Permian-Triassic) age strata are missing in the Karoo sedimentary sequence in the Limpopo Province (Van Zyl, 1950). The late Triassic to early Jurassic rocks therefore unconformably overlies the Ecca Group sedimentary rocks (Permian) in the Limpopo (Van den Berg, 1980).

4.3.2 Assessment of Potential Impacts, including cumulative impacts and the no-go alternative

The available literature shows that the Karoo strata of the Limpopo Province are exceptionally rich in fossils and that these layers occur at the study site (Figure 4-6). Several palaeontological sites have been reported from the Tuli Basin in South Africa and Zimbabwe and from the Tshipise Basin (Van den Berg, 1980; Brandl, 2002; Durand, 2005).

These fossils fall mainly into two groups: firstly, the plant leaf imprints, stem fossils and coal from the lower part of the Karoo-age sedimentary succession (Middle Permian) and secondly, the dinosaur and codont fossils from the upper part (Late Triassic to Early Jurassic) of the Karoo-age sedimentary succession.

Fossil leaf imprints were found in the Tuli Basin sedimentary rocks on the Venetia mine grounds, to the east of the study area in the Tshipise Basin, and to the north of the study area in southern Zimbabwe. The fossils from the Tuli Basin are mainly leaf imprints of the extinct plant *Glossopteris*). However, stem imprints of the horsetail *Equisetales* and leaf imprints of ferns are also common. The fossil localities reported in the Tuli Basin are contemporaneous to those in the Tshipise Basin described by Van den Berg (1980) and studied by the author in the Njalaland section of the Kruger National Park, Tshikondeni Mine, Venetia Mine and the farm Nottingham in southern Zimbabwe. The species composition of the fossils and the lithologies of the palaeontological sites are similar in the Tuli and Tshipise Basins (Brandl, 2002).

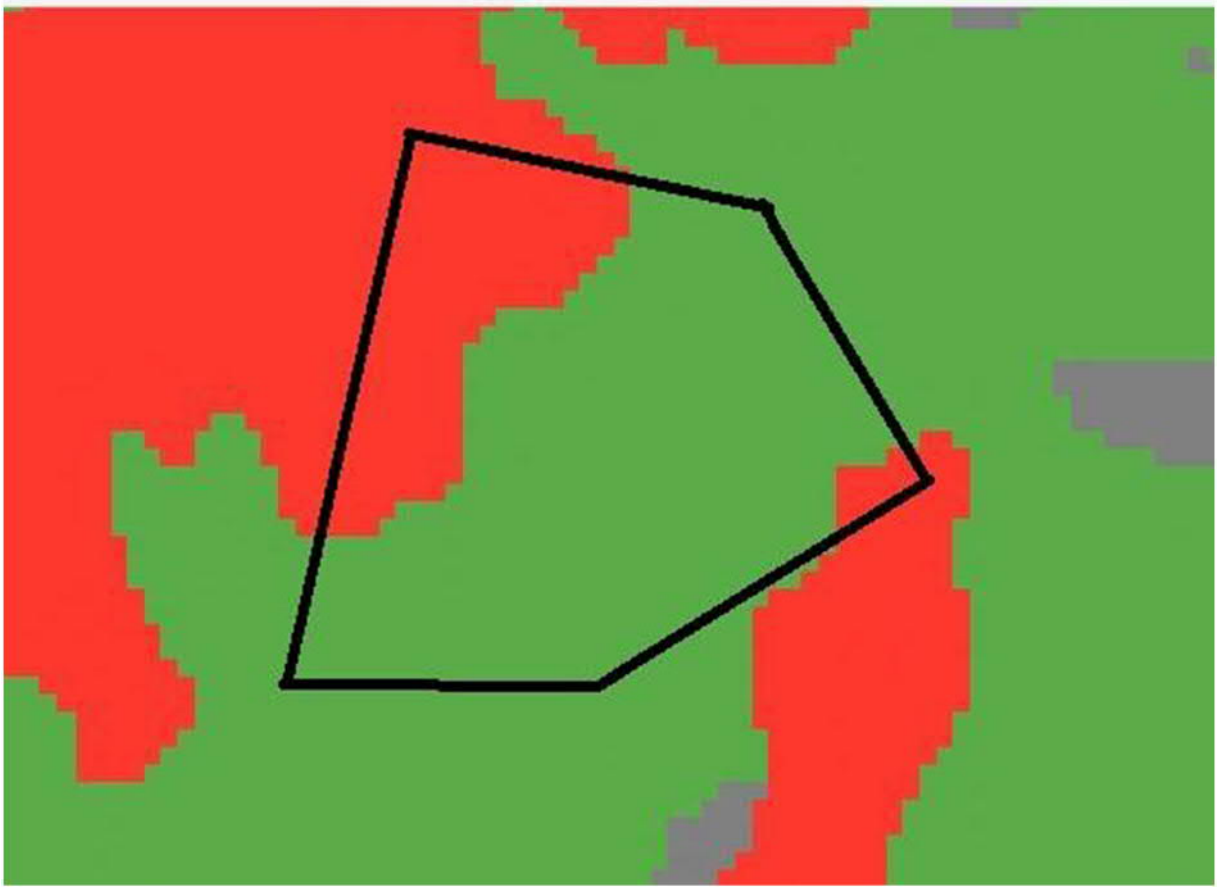


Figure 4-6: Palaeontological sensitivity map of Site 1 (black polygon) and surroundings (SAHRA, 2021)

Table 4-3: Legend related to the Palaeontological sensitivity map above.

Colour	Palaeontological Significance	Action
RED	VERY HIGH	Field assessment and protocol for finds are required.
GREEN	MODERATE	Desktop study is required.
GREY	INSIGNIFICANT / ZERO	No palaeontological studies are required.

In summary, the potential impact of the project on palaeontological resources is that fossils may be damaged during construction.

4.3.3 Proposed Mitigation Measures

- It is recommended that a walkdown field assessment be conducted to assess the site for any fossils before construction commences.
- Should fossils be found, a palaeontological specialist musty assess their significance prior and recommend appropriate mitigation, which may include excavation.
- A chance find protocol should be included in the EMPr to address the potential of any fossils being found during construction.
- Where palaeontological sites are uncovered, these sites must be recorded with a geospatial location point. These sites should be considered during the more detailed design phase to avoid the sites and their buffer zones as far as possible. Where these sites can be avoided, they must be fenced off as a no-go area to avoid any disturbance during construction.

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4.3.4 Conclusion

The region is known for its fossiliferous shales, sandstones and coal and it is likely that fossils will be encountered during construction. A palaeontologist has to be appointed to do a site assessment before construction may commence.

4.4 SOCIAL IMPACTS

Equispectives Research and Consulting Services was appointed to conduct the social impact assessment for the proposed project. The findings of this assessment are summarized in the sections below. For the full assessment of social impacts, refer to Annexure E3.

The establishment of the proposed SEF would provide a number of direct and indirect jobs. Direct jobs are created during manufacturing, construction and installation, operation and maintenance. The proposed PV project would also result in a large amount of expenditure in South Africa, both to procure services (e.g. transportation services) and materials (e.g. road building materials).

4.4.1 Description of the Baseline Conditions

4.4.1.1 Description of the area

The proposed project will be located in Ward 2 of the Musina Local Municipality that falls under the Vhembe District Municipality in the Limpopo Province. Ward 2 borders the Makhado Local Municipality that is also part of the Vhembe District, and the Blouberg Local Municipality that forms part of the Capricorn District Municipality. For context these two municipalities and their wards adjacent to Ward 2 will be included in the analysis. Ward 2 further borders Wards 1, 3, 4, 5 and 6 of the Musina Local Municipality which are excluded from the analysis due to their distance from the site, and the countries of Zimbabwe and Botswana. For the baseline description of the area, data from Census 2011, Community Survey 2016, municipal IDP's and websites were used.

The Limpopo Province is South Africa's most northern province and covers an area of 125 754 km^2 (www.municipalities.co.za). It shares an international border with Mozambique, Zimbabwe and Botswana. It also borders the Gauteng, Mpumalanga and North West Provinces. The capital of the province is Polokwane. Other major cities and towns include Bela-Bela, Lephalale, Makhado, Musina, Thabazimbi and Tzaneen.

Mining is the main driver of the economy and mineral deposits include platinum-group metals, iron ore, chromium, high and middle-grade coking coal, diamonds, antimony, phosphate, and copper. Mineral reserves include gold, emeralds, scheelite, magnetite, vermiculite, silicon and mica.
Crops grown in Limpopo include sunflowers, cotton, maize, peanuts, bananas, litchis, pineapples, mangoes, pawpaws, a variety of nuts, as well as tea and coffee. The Bushveld is known for cattle, where controlled hunting is often combined with ranching.

The Limpopo Province is linked to the Maputo Development Corridor through the Phalaborwa Spatial Development Initiative, which is a network of road and rail corridors connecting to the major seaports with the vision to open up the province for trade and investment. This is complimented by the presence of airports in major centres of the province.

Limpopo is divided into five districts, namely Capricorn, Mopani, Sekhukhune, Vhembe and Waterberg. The Vhembe District Municipality is located in the northern part of the Limpopo Province (www.municipalities.co.za) and covers an area of 25 596 km^2. It shares a border with the countries of Zimbabwe and Botswana in the north-west and the country of Mozambique in the south-east through

the Kruger National Park. Main towns in the area are Makhado (formerly known as Louis Trichardt), Malamulele, Musina and Thohoyandou. The main economic sectors are mining, community services and finance. The district consists of four local municipalities, namely Collins Chabane, Makhado, Musina and Thulamela.

The Musina Local Municipality covers an area of 10 347 km^2 (www.municipalities.co.za) and is the largest municipality in Vhembe District. The Mutale Local Municipality was merged with it in August 2016. It is bordered by Capricorn District Municipality as well as the countries of Botswana, Zimbabwe and Mozambique. The Beitbridge Border Post, one of the major border posts between South Africa and the rest of Africa is located in the municipal area. Musina (formerly known as Messina) is the main town and the main economic sectors are agriculture, mining and tourism. The Mapungubwe National Park is located in the municipal area.

4.4.1.2 Description of the population

The baseline description of the population will take place on three levels, namely provincial, district and local. Impacts can only truly be comprehended by understanding the differences and similarities between the different levels. The baseline description will focus on the Limpopo Province, Vhembe District Municipality, Musina Local Municipality and Ward 2 of the Musina Local Municipality; Makhado Local Municipality, Ward 21 of the Makhado Local Municipality; Capricorn District Municipality, Blouberg Local Municipality, and Ward 18 of the Blouberg Local Municipality.

The data used for the socio-economic description was sourced from Census 2011. Census 2011 was a de facto census (a census in which people are enumerated according to where they stay on census night) where the reference night was 9-10 October 2011. The results should be viewed as indicative of the population characteristics in the area and should not be interpreted as absolute.
In some municipalities the ward boundaries have changed in 2016 and StatsSA made Census 2011 data available that is grouped according to the 2016 boundaries. The ward level data will be shown for the 2016 ward delineations.

Where available, the Census 2011 data will be supplemented with data from Community Survey 2016.

Population and household sizes

According to the Community Survey 2016, the population of South Africa is approximately 55,7 million and has shown an increase of about 7.5% since 2011. The household density for the country is estimated on approximately 3.29 people per household, indicating an average household size of 3-4 people (leaning towards 3) for most households, which is down from the 2011 average household size of 3.58 people per household. Smaller household sizes are in general associated with higher levels of urbanisation.

The greatest increase in population since 2011 has been in the Musina LM (Table 4-4), much higher than the national average. The Blouberg LM showed a decrease in population between 2011 and 2016. Population density refers to the number of people per square kilometre and the population density on a national level has increased from 42.45 people per km^2 in 2011 to 45.63 people per km^2 in 2016. In the study area the population density has increased in all areas since 2011, except in the Blouberg LM where it declined.

Table 4-4: Population density and growth estimates (sources: Census 2011, Community Survey 2016)

Area	Size in km^2	Population 2011	Population 2016	Population density 2011	Population density 2016	Growth in population (%)
Limpopo Province	125,754	5,404,868	5,799,090	42.98	46.11	7.29
Vhembe DM	*25,596*	*1,294,722*	*1,393,949*	*50.58*	*54.46*	*7.66*
Musina LM	10,347	68,359	94,461	6.61	9.13	38.18
Makhado LM	7,605	516,031	542,416	67.85	71.32	5.11
Capricorn DM	*21,705*	*1,261,463*	*1,330,436*	*58.12*	*61.30*	*5.47*
Blouberg LM	9,540	162,629	160,604	17.05	16.83	-1.25

The number of households in the study area has increased in all areas since 2011, except in the Blouberg LM where it declined (Table 4-5). On provincial, district level and local level (excluding Blouberg LM) the proportionate increases in households were much greater than the increases in population. In the Musina LM the number of households increased with approximately two thirds. The average household size has shown a decrease on provincial, district and local level (excluding Blouberg LM), which means there are more households, but with less members.

Table 4-5: Household sizes and growth estimates (sources: Census 2011, Community Survey 2016)

Area	Households 2011	Households 2016	Average household size 2011	Average household size 2016	Growth in households (%)
Limpopo Province	1,418,102	1,601,083	3.81	3.62	12.90
Vhembe DM	335,276	382,357	3.86	3.65	14.04
Musina LM	20,042	33,263	3.41	2.84	65.97
Makhado LM	134,889	149,229	3.83	3.63	10.63
Capricorn DM	342,838	378,301	3.68	3.52	10.34
Blouberg LM	41,192	40,687	3.95	3.95	-1.23

The total dependency ratio is used to measure the pressure on the productive population and refer to the proportion of dependents per 100 working-age population. As the ratio increases, there may be an increased burden on the productive part of the population to maintain the upbringing and pensions of the economically dependent. A high dependency ratio can cause serious problems for a country as the largest proportion of a government's expenditure is on health, social grants and education that are most used by the old and young population.

The total dependency ratio (Table 4-6) varies by municipal area. The same trend applies to the youth, aged and employment dependency ratios. The dependency ratios in Ward 2 is the lowest of all the areas under investigation, while the Blouberg LM has the highest dependency ratios. There are areas under traditional authority on both the Blouberg and Makhado local municipal areas, and often in these areas adults of working age migrate to urban areas looking for opportunities to create a livelihood.

Table 4-6: Dependency ratios (source: Census 2011).

Area	Total dependency	Youth dependency	Aged dependency
Limpopo Province	67.3	56.8	10.5
Vhembe DM	*69.9*	*59.3*	*10.7*

Musina LM	56.1	50.4	5.7
Ward 2	30.9	28.1	2.8
Makhado LM	69.7	58.1	11.7
Ward 21	48.3	40.1	8.2
Capricorn DM	*67.0*	*56.1*	*11.0*
Blouberg LM	87.0	72.7	14.3
Ward 18	75.2	68.6	6.5

Poverty is a complex issue that manifests itself in economic, social and political ways and to define poverty by a unidimensional measure such as income or expenditure would be an oversimplification of the matter. Poor people themselves describe their experience of poverty as multidimensional. The South African Multidimensional Poverty Index (SAMPI) (Statistics South Africa, 2014) assess poverty on the dimensions of health, education, standard of living and economic activity using the indicators child mortality, years of schooling, school attendance, fuel for heating, lighting and cooking, water access, sanitation, dwelling type, asset ownership and unemployment.

The poverty headcount refers to the proportion of households that can be defined as multi-dimensionally poor by using the SAMPI's poverty cut-offs (Statistics South Africa, 2014). The poverty headcount has increased in almost all the areas since 2011 (Table 4-7), indicating an increase in the number of multi-dimensionally poor households, especially in the Blouberg area. In the Musina municipal area the poverty headcount decreased, which is in line with high increase of households in the area, indicating a boom in economic opportunities in the area. In the Vhembe district, there was a slight decrease in the poverty headcount, likely due to the great decrease in the Musina area.

The intensity of poverty experienced refers to the average proportion of indicators in which poor households are deprived (Statistics South Africa, 2014). The intensity of poverty has increased in all areas, except the Musina LM where it showed a slight decrease. The intensity of poverty and the poverty headcount is used to calculate the SAMPI score. A higher score indicates a very poor community that is deprived on many indicators. The SAMPI score has increased in all areas except in the Musina LM where it showed a great decrease, indicating that households might be getting poorer in the other areas, especially in the Blouberg LM area.

Table 4-7: Poverty and SAMPI scores (sources: Census 2011 and Community Survey 2016).

Area	Poverty headcount 2011 (%)	Poverty intensity 2011 (%)	SAMPI 2011	Poverty headcount 2016 (%)	Poverty intensity 2016 (%)	SAMPI 2016
Limpopo Province	10.1	41.6	0.042	11.5	42.3	0.049
Vhembe DM	*13.0*	*41.5*	*0.054*	*12.8*	*42.4*	*0.054*
Musina LM	7.8	40.8	0.032	5.6	40.3	0.023
Makhado LM	10.8	41.2	0.044	11.6	42.8	0.050
Capricorn DM	*7.2*	*41.6*	*0.030*	*8.5*	*41.8*	*0.036*
Blouberg LM	9.3	42.1	0.039	12.1	43.2	0.052

Population composition, age, gender and home language

More than 90% of the population belong to the Black population group (Figure 4-7), with the greatest proportions of people belonging to another population group (White) IN Ward 21 of the Makhado LM and Ward 2 of the Musina LM.

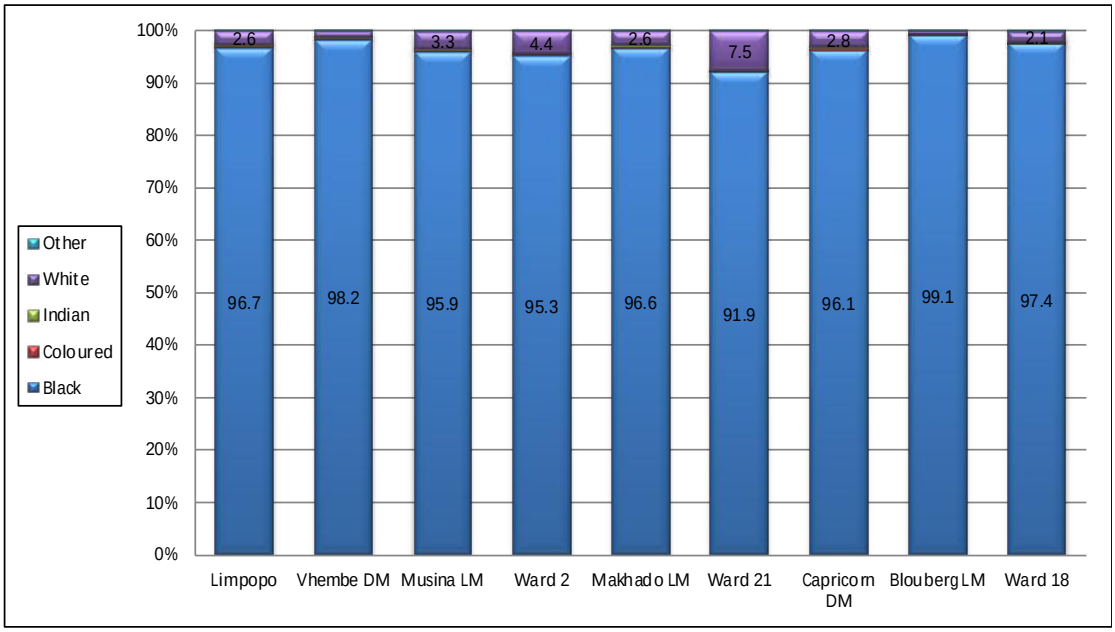


Figure 4-7: Population distribution (shown in percentage, source: Census 2011)

The average age on local level is lower than on district level, but higher than on provincial level (Table 4-8). On a ward level the average age is lower than on local level, except in Ward 14 where the average age is higher than on district level.

Table 4-8: Average age (source: Census 2011)

Area	Average Age (in years)
Limpopo Province	26.47
Vhembe DM	*26.05*
Musina LM	25.05
Ward 2	26.91
Makhado LM	26.87
Ward 21	28.41
Capricorn DM	*26.84*
Blouberg LM	25.64
Ward 18	23.38

In the Blouberg municipal area more than a third of the population is aged 14 years or younger (Figure 4-8). Such a young population holds the potential for a great future demand in terms of employment and other means of making a livelihood, as well as increased pressure on infrastructure. Ward 2 of the Musina LM has the lowest proportion aged 14 years or younger.

The sex distribution is biased towards females in all areas except Ward 2 of the Musina LM where it is biased towards males and Ward 21 of the Makhado LM where it is more or less equal (Figure 4-9). This trend is often observed in rural areas where males tend to migrate to urban areas to look for employment or other means of making a livelihood.

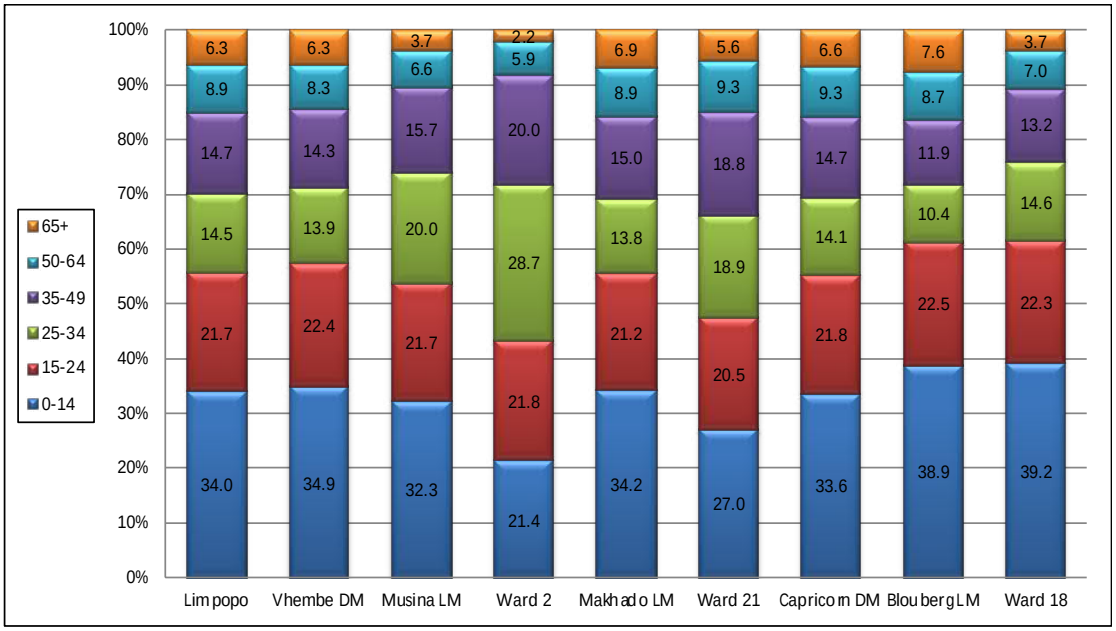


Figure 4-8: Age distribution (shown in percentage, source: Census 2011)

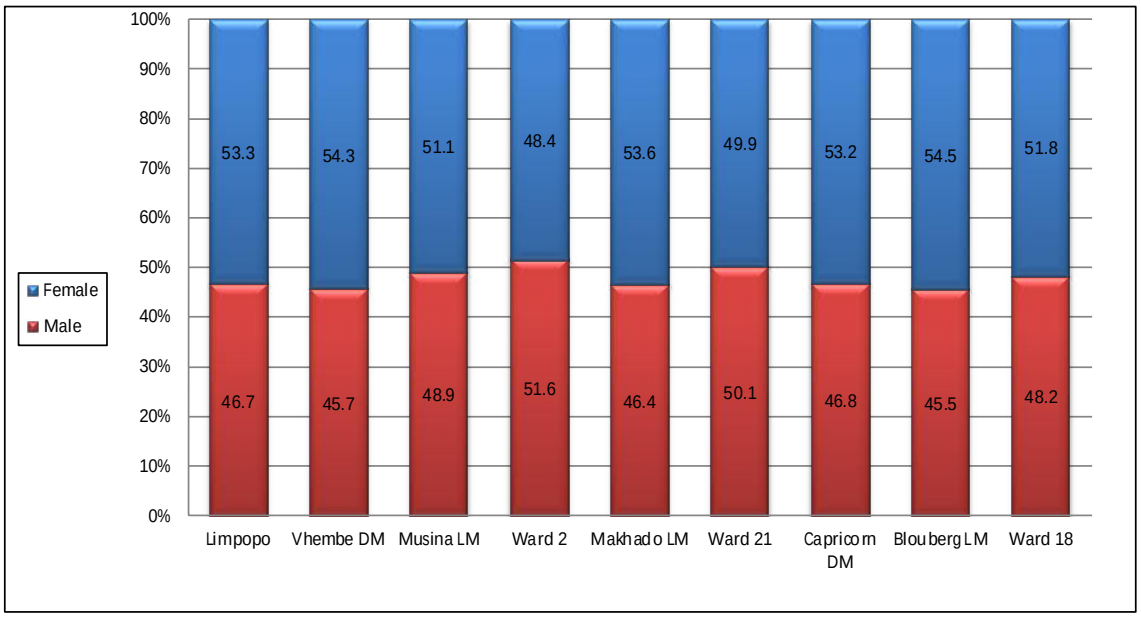


Figure 4-9: Sex distribution (shown in percentage, source: Census 2011)

Sepedi is the home language of more than 80% of the population in the Capricorn district and this trend holds for the Blouberg LM and Ward 18 of the BLouberg LM (Figure 4-10). In the Vhembe district the dominant home language is Tshivenda followed by Xitsonga. The majority of people in the Musina LM, Makhado LM and Ward 21 of the Makhado LM have Tshivenda as home language. In Ward 2 of the Musina LM there is a variety of home languages and the language spoken by most is Tshivenda, followed by 'Other' and Sesotho. The 'Other' category most likely include languages from the neighbouring countries. Home language can indicate the degree of cultural diversity in an area.

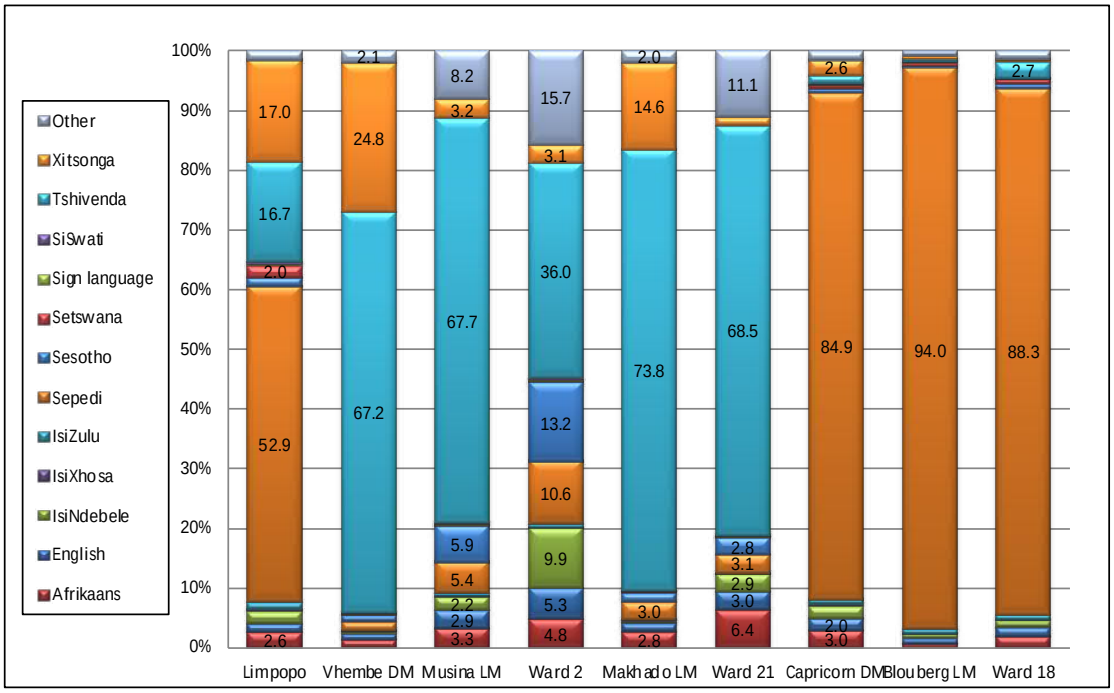


Figure 4-10: Language distribution (shown in percentage, source: Census 2011)

Education:

On a ward level, Ward 18 of the Blouberg LM has the highest proportion of people aged 20 years or older whom have completed an education of Grade 12 or higher (Figure 4-8), but also the highest proportion of people that did not have any schooling.

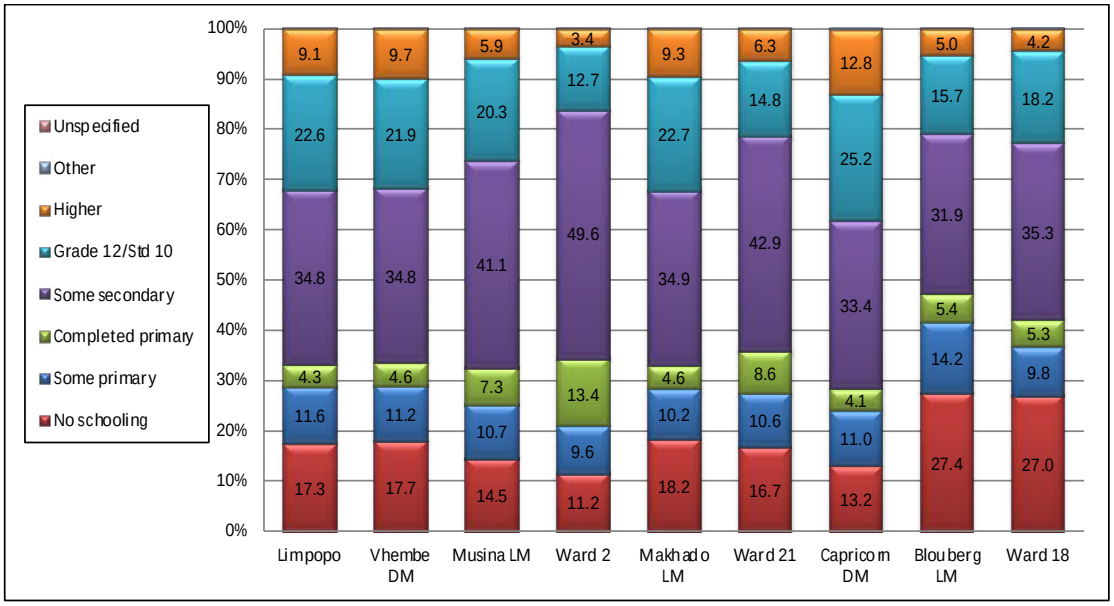


Figure 4-11: Education profiles (those aged 20 years or older, shown in percentage, source: Census 2011)

Employment, livelihoods and economic activities

Ward 2 of the Musina LM has the highest proportion of people aged between 15 – 65 years that are employed (Figure 4-12), with more than 70% of this group being employed in the formal sector (Figure 4-13). Ward 18 of the Blouberg LM has the highest proportion of people that area not economically active as well as the largest proportion of people that are employed in a private household.

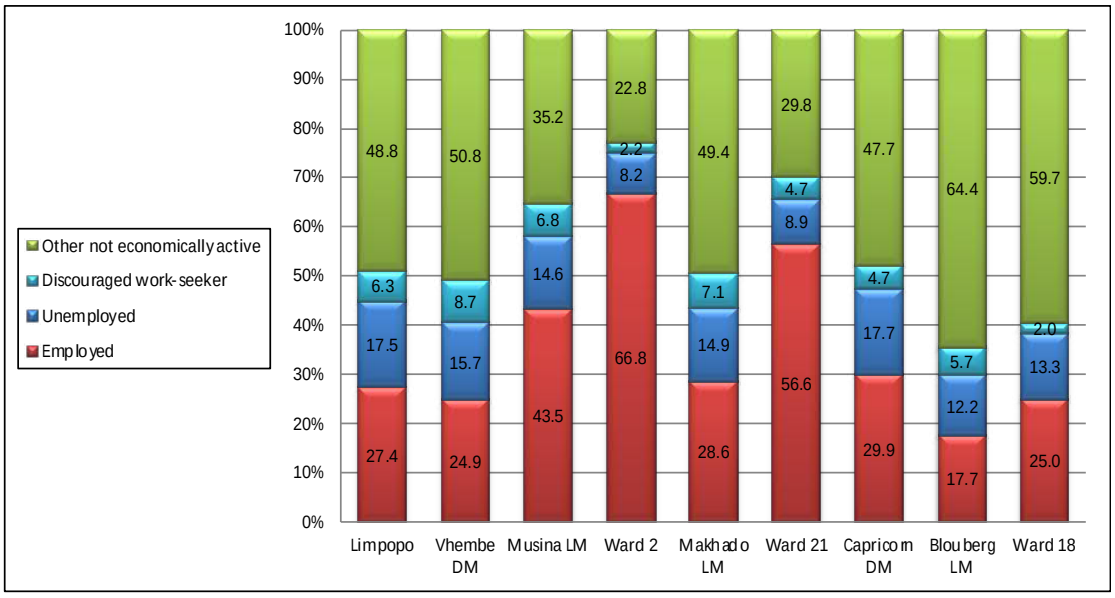


Figure 4-12: Labour status (those aged between 15 - 65 years, shown in percentage, source: Census 2011)

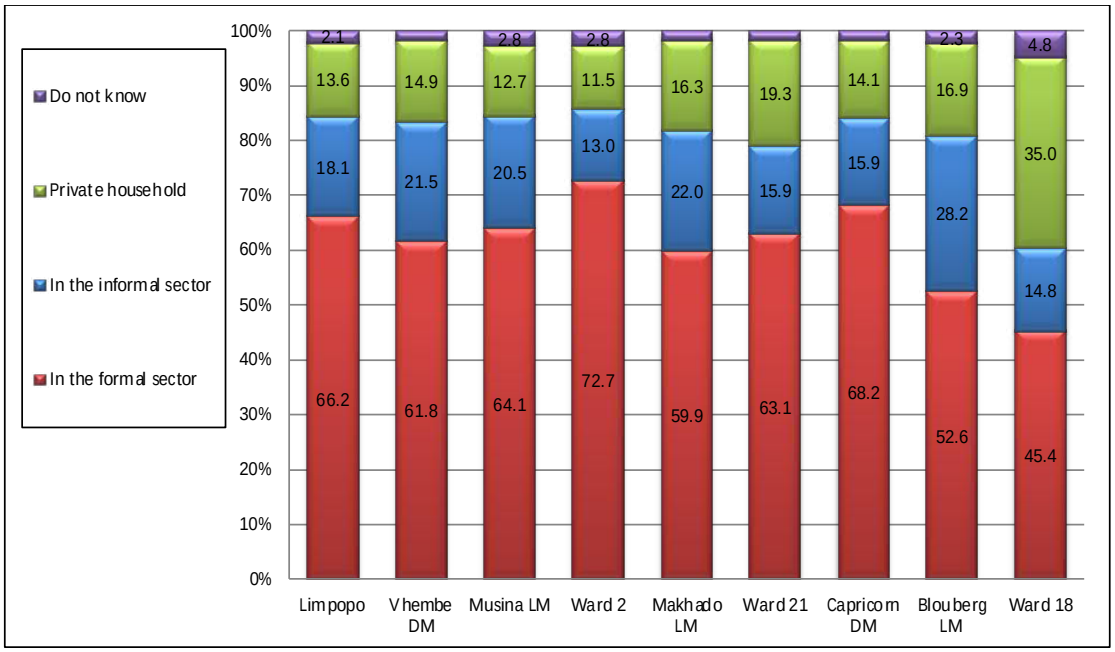


Figure 4-13: Employment sector (those aged between 15 - 65 years, shown in percentage, source: Census 2011)

The proportion of people with no annual household income is the highest in Ward 18 of the Blouberg LM and the lowest in Ward 21 of the Makhado LM and Ward 2 of the Musina LM (Figure 4-14). More than half of the households on all levels had an annual household income of below R19 601 in 2011.

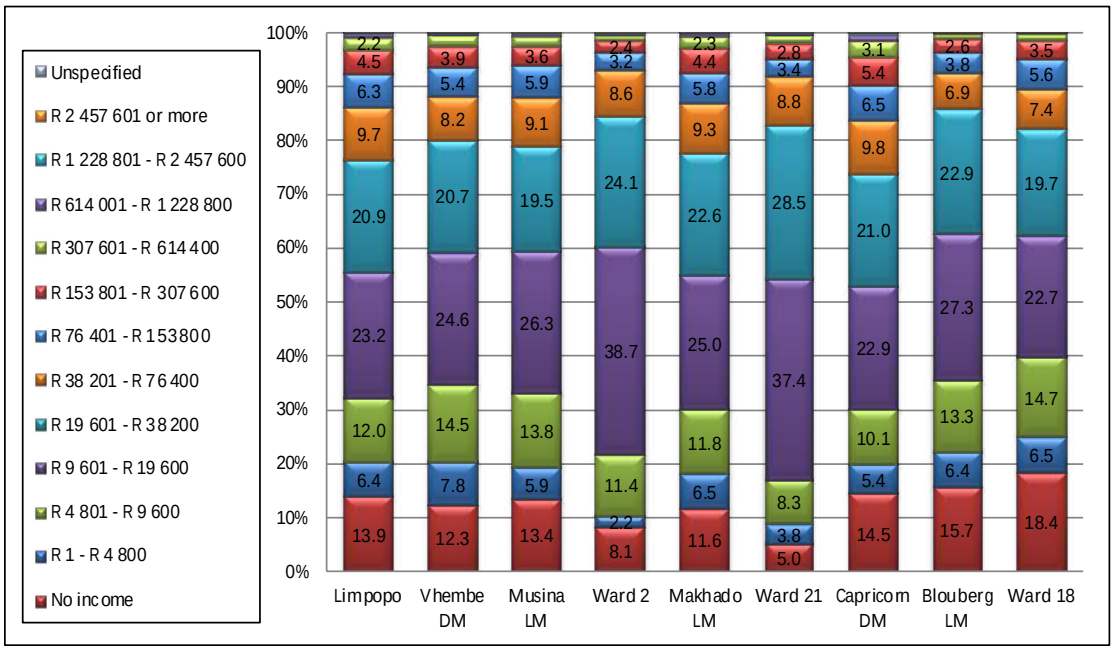


Figure 4-14: Annual household income (shown in percentage, source: Census 2011)

Statistics South Africa (2015) has calculated the Food Poverty Line (FPL) for the Limpopo Province as R338 per capita per month for 2011, where the FPL is the Rand value below which individuals are unable to purchase or consume enough food to supply them with the minimum per-capita-per-day energy requirement for good health. The FPL is one of three poverty lines, the others being the upper bound poverty line (UBPL) and the lower bound poverty line (LBPL). The LBPL and UBPL both include a non-food component. Individuals at the LBPL do not have enough resources to consume or purchase both adequate food and non-food items and are forced to sacrifice food to obtain essential non-food items, while individuals at the UBPL can purchase both adequate food and non-food items. The LBPL for the Limpopo Province was R485 per capita per month in 2011 and the UBPL R627 per capita per month respectively. More recent poverty lines than the rebased poverty lines for 2011 are not available. Based on this, a household with four members needed an annual household income of approximately R17 000 in 2011 to be just above the FPL. When comparing this with the SAMPI data it seems as if there are more households below the poverty lines in the area than who are multi-dimensionally poor. This is due to the poverty lines using a financial measure and do not take into consideration payment in kind and livelihood strategies such as subsistence farming. If these were to be converted into a Rand value, the poverty line picture may have a closer resemblance to the SAMPI data.

4.4.2 Assessment of Potential Impacts, including cumulative impacts and the no-go alternative

Positive impacts associated with the project could include:

- Local and national economic opportunities;
- Employment and skills transfer; and
- Generation of renewable energy which may relieve pressure on the national electricity grid.

Negative impacts that might be associated with this project include:

- Environmental impacts with a social dimension related to potential exposure to nuisances such as dust, noise, and vibration;
- Safety and security, including:
    - Property theft

  - Violence
  - Improper conduct by security service providers.
- Unmet expectations by the local communities and municipalities in terms of employment, procurement and electricity supply;
- Water allocation, as water is a scarce resource in the area;
- Traffic impacts; and
- Presence of construction workers.

Cumulative social impacts are also to be considered during the EIA-phase. The aim thereof is to highlight impacts that are expected to occur as result of the combined effect of the proposed project and other current or planned operations in the area. Cumulative impacts could include:

- Unmet expectations around employment and procurement and direct benefit from electricity supply;
- Pressure on municipal infrastructure due to the increased traffic, waste production and presence of increased number of construction workers in the area;
- Social impacts related to the nature reserve and its value to the surrounding game farmers.

The no-go alternative will have a neutral impact as the status quo will remain.

4.4.3 Proposed Mitigation Measures

- Adopt a local procurement policy to maximise the benefit to the local community.
- The applicant should liaise with the local economic development organs of the relevant municipalities, local leaders and NGOs about their recruitment policy to ensure it is in line with the local practices and tap into existing knowledge.
- The recruitment policy for the project must set reasonable targets for the employment of local people and women. The applicant and the municipalities should identify these targets before recruitment commences. The definition of "local" must be clarified with the affected stakeholders.
- Mitigation measures from the specialist studies dealing with the biophysical aspects of the impacts should give guidance on dealing with the impacts, but it should be considered that at times merely adhering to legal requirements may not be sufficient.
- The proponent should work with existing community groups to put security protocols in place or to fit in with existing protocols. Ensure sufficient safety measures for construction material, infrastructure and traffic management are implemented.
- The proponent needs to have a stakeholder engagement strategy in place with clear communication, and where relevant guidelines, around these issues.
- The proponent must ensure that baseline measurements are taken and water availability is monitored regularly.

4.4.4 Conclusion

A more in-depth assessment of social impacts and possible mitigation measures will be possible once further stakeholder consultation takes place. Impacts resulting from this project will be cumulative to existing impacts. At this stage the impacts are anticipated to relate to expectations regarding the creation of opportunities, environmental impacts with a social dimension, safety and security, traffic management and concerns regarding water. None of these risks or possible impacts is seen as a fatal flaw in the possible successful execution of the proposed project. All the risks can be managed, and most potential social impacts can be mitigated. The importance of addressing the risks as early in the project cycle as possible must be underlined, since failure to do so may result in the risks growing in magnitude.

4.5 IMPACTS ON VISUAL LANDSCAPE

The findings of this assessment are summarized in the sections below. For the assessment of landscape and visual impacts, refer to Annexure E7.

4.5.1 Description of the Baseline Conditions

This section aims to analyse and describe the intrinsic value of the existing landscape, including aspects of the natural, cultural, and scenic landscape. The sections below describe the character, uniqueness, intactness, quality, rarity, and vulnerability from a desktop perspective. The below descriptions are based and elaborated on the site's characteristics as described in section 4.1.1.

4.5.1.1 Climate

As a result of climate variations throughout the year, the appearance and perception of the natural landscape changes with the season. The vegetation of the Study Area appears more muted during the winter months with green -grey, brown and yellow as the dominant landscape colours, while various shades of light to deeper green are present during the summer months.

4.5.1.2 Topography

The natural topography could possibly provide some screening ability in isolated areas, but in general it appears that topography alone will not play a significant role in the screening of proposed infrastructure.

4.5.1.3 Landcover

With reference to Figure 4-15 it is clear that the landcover primarily consist out of open woodland with patches of natural grassland in between. The existing Venetia Mine is located approximately 5km east of the proposed infrastructure.

4.5.1.4 Vegetation cover

The Study Area falls within Savanna Biome which is characterized by a grassy ground layer and distinct layer of woody plants. According to *Mucina & Rutherford* (2006) the vegetation type of the study area classified primarily as the *Musina Mopane Bushveld*. The vegetation type is associated with open woodland to moderately closed shrubveld dominated by *Colophospermum mopane* and *Combretum apiculatum* on hills. The field layer becomes more open during the dry season and the herbaceous layer is poorly developed in areas with dense cover of *Colophospermum mopane*. Tall trees (classified by Mucina and Rutherford as more than 10m in height) appears as single trees in isolated areas. The Study Area comprises a low to moderate height (between 3 -7m) irregular canopy structure which can provide visual screening ability to some of the proposed infrastructure components.

4.5.1.5 Landscape character

Landscape character is a distinct, recognisable, and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse. Landscape character includes the natural and man-made attributes of the Study Area, including topography, land cover and vegetation. The overall landscape character is influenced negatively by incompatible activities, or positively by the presence of natural and/or man-made features, such as steep gradients, presence of rocky ridges, natural vegetation, pans, and floodplains.

The landscape character associated with the study area can be described as rural with flat to moderately undulating plains with natural vegetation characterised by an herbaceous layer and a discontinuous, open tree layer, to moderately closed shrubveld often represented in clumps.

Agriculture and game farming (with associated eco-tourism) is the main land use. The existing Venetia Mine (located approximately 5km to the east of the site) forms a dominant component in the landscape, detracts and stand in contrast to the overall natural and rural feel.

The Study Area falls within the Venetia Limpopo Nature Reserve located in the Vhembe Biosphere Reserve and the greater MCLWHS, which are home to a number of formal protected areas such as private nature reserves, the Mapungubwe National Park (MNP) and other conservation areas, containing evidence for an important interchange of human values that led to far-reaching cultural and social changes in Southern Africa between AD 900 and 1300. The region offers an expansive savannah landscape at the confluence of the Limpopo and Shashe Rivers and offers tourist activities such as hunting, hiking, birding and mountain biking.

The MNP (inscribed as a Cultural Heritage Site in 2003) is located approximately 22km north of the proposed development. This park contains rich fossil deposits, Bushman rock art and gold artifacts of ancient civilizations that once flourished here. The giant baobab trees, riverine forests and associated flood plains provide an intriguing mix of habitat for various species.

Other smaller private nature reserves within a 10km radius include:

Name	Approximate distance and direction from proposed project
LJ Steyn Nature Reserve	12 -13km (South east)
PA Coetzer Nature Reserve	7km (South west)
Annexatie Nature Reserve	15km + (South west)
JS Gouws Private Nature Reserve	9km (North west)
Roux Private Nature Reserve	8km (North east)
Seduka Private Nature Reserve	8km (North east)

Private lodges and game ranches within a 10km radius include:

Name	Approximate distance and direction from proposed project
Zelpy Guest Farm	5.4km (South west)
Corea Game Ranch	2km (West)
Kolope Lodge	5.2km (South west)
Kaalkraal Lodge	4.4km (South)
Abend -Ruhe-Getha	7.4km (south east)
Evangelina Game Lodge	7.5km (North west)

The nearest large town is Musina, located 80km west of the site. Except for the existing mining activities to the west (which is the greatest landscape transformation) there seem to be little anthropogenic transformations evident in the Study Area, the site and its immediate surrounds are mostly remote with little activity.

It is expected that the proposed combined activities will have moderate impact on the landscape character.

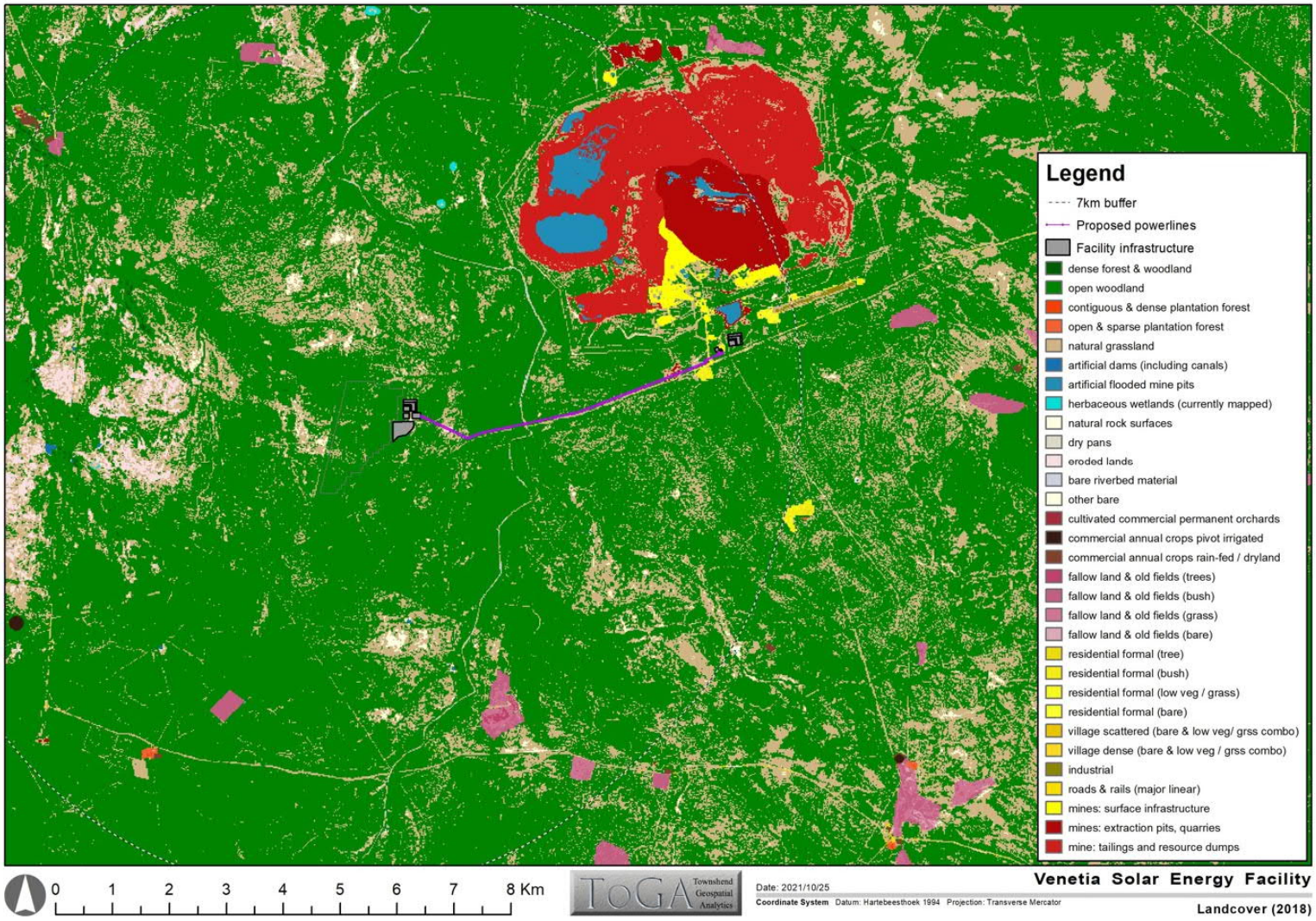


Figure 4-15: Landcover of the site and surrounding environment

4.5.1.6 Visual absorption capacity (VAC) and visual intrusion

VAC is an indication of the ability of the landscape to visually conceal the proposed development. Areas with high VAC can accommodate and absorb physical changes in the landscape without transforming its visual character and quality, while a low VAC rating implies a low ability to absorb or conceal visual impacts (Oberholzer, 2005). The factors that contribute to the VAC factor includes topographical diversity, vegetation, soil contrast, visual pattern, and recovery time.

VAC is further closely related to visual intrusion, which refers to the physical characteristics and nature of the contrast created by a project on the visual aspects of the receiving environment. It is also, as with VAC, a measure of the compatibility or the conflict of a project with the existing landscape and surrounding land use.

The topography offers little screening ability but could offer some degree of screening form certain locations (this will have to be confirmed during the site visit). A moderate contrast in colour (various open dry soil patches evident from aerial imagery) is expected between the proposed development and the natural landscape, especially during the construction phase of the project when vegetation clearing takes place. PV panel height will be limited (between 4 -8m in height) and natural vegetation could offer screening ability, especially if viewed from a distance.

Natural vegetation will not be able to offer any screening ability for pylons associated with the overhead transmission lines. Considering the existing vegetation patterns, the recovery time after construction will be between 3 – 5 years. The overall VAC of the study area is considered moderate.

The visual intrusion for the proposed infrastructure will also be moderate even though the landscape offers some visual variety and discontinuity in terms of lines, form and colours which are mostly associated with mining activities (there are no existing transmission lines along the Venetia Mine access road). It is however not certain at this stage if the existing mining activities will be viewed in conjunction with the proposed development.

4.5.1.7 Landscape quality

Landscape quality is based on human perceptions and expectations in the context of the existing environment. A landscape's visual quality is therefore a factor of an observer's emotional response to physical landscape characteristics and therefore assigning values to visual resources is therefore a subjective process. Landscape quality increases with the presence of water, topographic ruggedness and where diverse patterns of vegetation occur. Areas that contain more natural features or harmonious man-made compositions will have a more favourable landscape quality than areas with non-harmonious human activity.

The landscape associated with the Study Area provides little topographical variety and is mostly associated with flat plains and open canopy bushveld vegetation with bare soil patches in between and limited anthropogenic structures, except for the mining activities located to the west. Typical to this vegetation type (*Musina Mopane Bushveld*) the natural vegetation within the study area is homogenous. From the desktop analysis, intensity or variety in colours and contrast between the soil and vegetation is present, however it is not a dominant scenic element. The landscape of the site is not distinctive to the study area and also not unique to the larger region, as there are numerous open parcels of land with similar or higher landscape quality. Based on the desktop analysis the overall landscape quality is moderate.

4.5.1.8 Landscape value

Landscape value is concerned with the relative value attached to a specific landscape by society, bearing in mind that a landscape may be valued by different stakeholders for a whole variety of reasons. Value can apply to areas of landscape as a whole or to the individual elements, features and aesthetic or perceptual dimensions which contribute to the character of the landscape (IEMA, 2013).

In determining landscape value, the people, or groups of people who could be affected by the proposed development should be considered, due to landscape being valuable to people in different ways.

The study area is likely to be most valued by tourists who visit private nature reserves, guest houses game ranches and game lodges on private game reserves within the greater Mapungubwe Cultural Landscape for either recreational or leisure purposes.

The Study Area is also likely to be moderately valued by residents permanently residing in the area (which do not have a direct connection with the mine) and the proposed project may therefore lower the landscape value for the above group of receptors through the direct loss of vegetation, especially during the construction phase of the project.

Contractors or permanent employees who work at Venetia Mine will have a different perception because of their more regular contact with the landscape and the ongoing mining related type changes within it. The proposed project will not affect the landscape value for these receptors.

4.5.1.9 Night-time lighting

To determine the potential visual impact of night time lighting, it is important to understand the existing lighting levels within the Study Area. The Institute for Lighting Professionals (ILP) 2011 identifies five zones of environmental zones for exterior lighting control, describing the existing lighting conditions within the landscape. These zones are supported by design guidelines to reduce lighting pollution, which can inform mitigation measures.

The proposed study area has low district brightness as it falls within a rural area, which is relatively dark, except for lights associated with the Venetia Mine and isolated light sources from guest houses, game lodges and homesteads. The mine has already significantly contributed to sky glow and artificial lighting within the study area. Due to the nature of the development, it is expected that the proposed infrastructure will not have a significant contribution to additional night-time lighting in the area.

4.5.1.10 Sense of place

The unique sense of place or *'genius loci'* will be determined and described in the EIR as part of the next phase of the EIA process.

4.5.1.11 Visual exposure and visibility

Visual exposure refers to the geographic area from which the proposed project will be visible and is defined by the degree of visibility of a proposed project from various receptor sites. According to Hull and Bishop (1998), the visual exposure of the proposed project is based on the distance from the proposed source of impact and usually fades out beyond 7km. The visibility of an object decreases exponentially over distance and accordingly visual impact will diminish as the viewer moves away from

the object being viewed. It is also important to note that the actual zone of visual influence of the proposed project may be smaller than indicated because of screening by existing vegetation and infrastructure.

Visibility or viewshed / Zone of Theoretical Visibility (ZTV) is the geographical area from which the project will be visible and is determined by the distance between the proposed project components and the visual receptor. The viewshed includes all the major observation sites from where the proposed project will be visible and is dictated primarily by topography, however, distance, local development (anthropogenic structures) and vegetation can reduce this area. The viewshed is theoretical as it assumes direct line of sight between any point within the viewshed and the object being viewed.
A Geographic Information System (GIS) has been used to generate the viewshed analyses for the proposed project and related infrastructure, refer to Figure 4-16 and Figure 4-17. The system has 3D topographical modelling capabilities, including a line-of-sight analysis. For this project, the viewshed analysis was generated by means of contours using the proposed project and height of the associated infrastructure components. The visibility of a development and its influence on visual impact is rated using the criteria listed in Table 4-9 below.

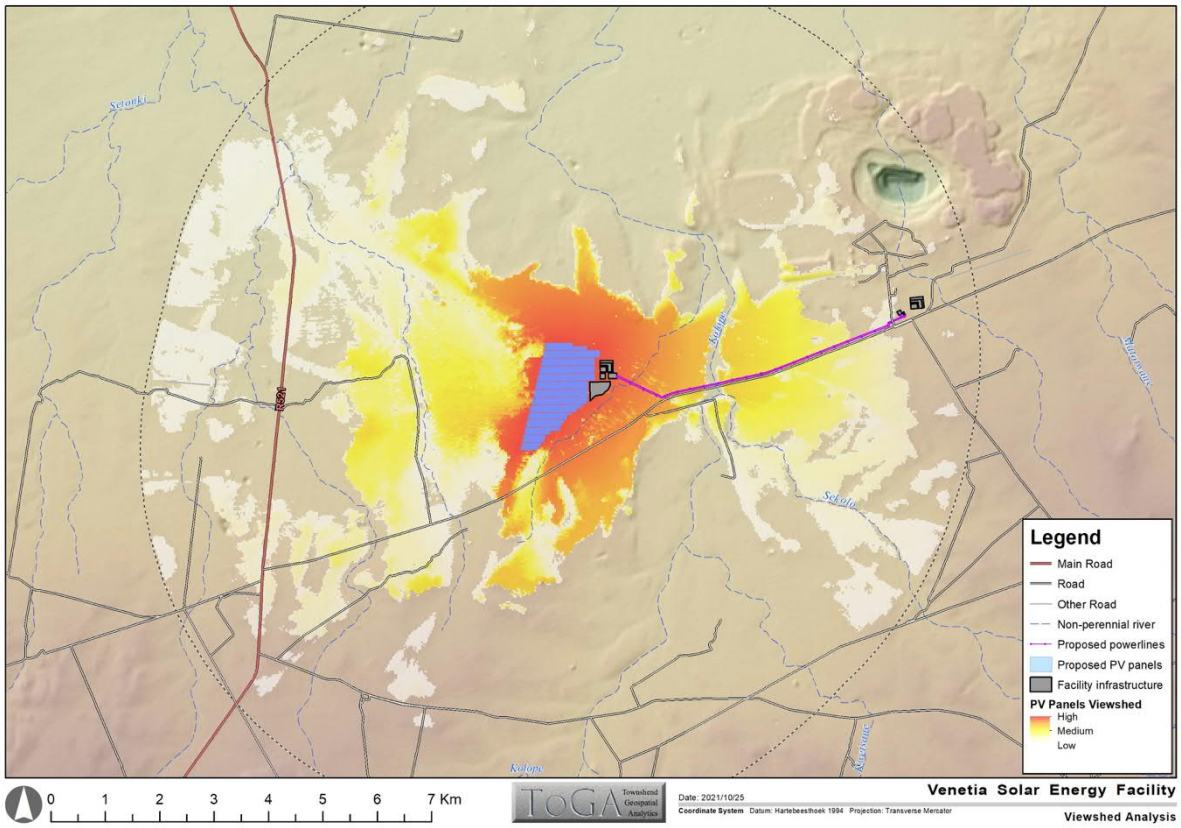


Figure 4-16: Viewshed analysis for PV panels on Site 1

Table 4-9: Visibility classes, IEMA (2013)

Class	Description
Highly visible	Clearly noticeable within the observer's view frame 0-2km
Moderately visible	Recognisable feature within the observer's view frame 2-3km
Marginally visible	Not particularly noticeable within the observer's view frame 3-5km
Hardly visible	Practically not visible unless pointed out to observer beyond 5-7km

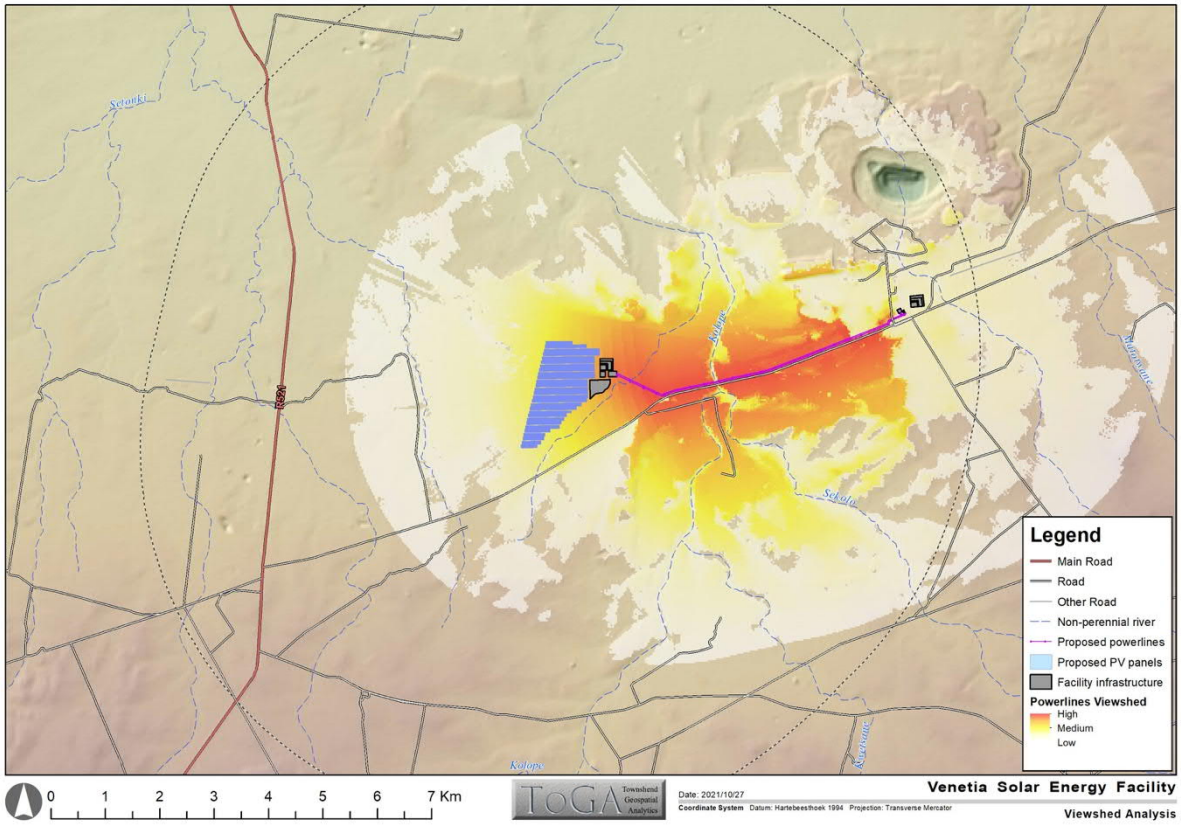


Figure 4-17: Viewshed analysis for the transmission line from Site 1

PV Panels

According to the viewshed analysis the proposed infrastructure will have high visibility between 0-2km in a northern, eastern, and southern direction, high visibility is expected between 0 -1km in a western direction. Visibility becomes moderate after 2km in a western and eastern direction and ends abruptly (between 2-3km) towards the north as a result of topographical variations. Visibility will be moderate - marginal in a southern direction (between 3-4km) whereafter it will be limited as a result of the natural topography. Low visibility is expected (infrastructure will be hardly visible) in isolated areas between 5-7km in a western and eastern direction.

The viewshed analysis indicates that the proposed PV panels will not be visible from:

- The existing Venetia Mine;
- The R521 Road (link between Alldays and Pont Drift Border); and
- Any of the private nature reserves

The proposed PV panels could possibly be visible from:

- Corea Game Ranch (it is expected that the natural vegetation will provide sufficient screening ability); and
- Zelpy Guest Farm (it is expected that the natural vegetation will provide sufficient screening ability)

The proposed PV panels will be visible from the Venetia Mine access road.

132kV transmission lines

The transmission line will be highly visible between 0 -1km in a northern and southern direction, whereafter it will be moderately visible, between 1-3km. Visibility will be low after 3km and will not extend further than 5km in both these directions.

As a result of the natural topography visibility will be low in an eastern direction and will not extend further than 4km. Visibility will be high – moderate between 0 -3km in a western direction, after this distance, visibility will be low and will not continue beyond 5km.

The viewshed analysis indicates the proposed transmission line will not be visible from:

- Zelpy Guest Farm.

The proposed transmission line could possibly be visible from:

- Corea Game Ranch; and
- Abend Ruhe Gotha Guest House.

The proposed transmission line will be visible from:

- The entrance to Venetia Mine; and
- The section along the Venetia Mine access road.

4.5.1.12 Visual receptors

Receptors are potential viewers of the proposed development. The perception of viewers is difficult to determine as there are many variables to consider such as:

- Familiarity with the actual scene;
- The location and context of the viewpoint;
- Circumstances that bring them into contact with that view (occupation or activity of the receptor) and;
- Nature and importance of the view (full or glimpsed, near or distant).

Other variables include cultural background, state of mind and how often the proposed project is viewed within a set period. Therefore, it is necessary to generalize the viewer sensitivity to some degree. Potential visual receptors that may be affected by the proposed project include:

- Users of recreational landscapes and public footpaths, including tourists and visitors;
- Residents;
- Users of public sports grounds and amenity open space;
- Users of public roads and railways;
- Workers; and
- Views of or from within valued landscapes.

Of the above visual receptors as mentioned above the most sensitive may include:

- Users of outdoor recreational facilities, whose attention or interest is focused on the landscape;
- Communities for whom the proposed development results in changes in the landscape setting or valued views that they enjoy; and
- Residential property owners with views affected by the proposed development.

The sensitivity of the receptors is indicated in Table 4-10 below and have been drawn from publicly accessible viewpoints, the sensitivity of which would be dependent on the location, the activity of the viewer and the importance of the view.

Table 4-10: Receptor sensitivity

Receptor sensitivity	Explanation
High	Views to and from scenic routes

Moderate	Views to and from residential areas, agricultural areas, sporting / recreational areas or places of work.
Low	Views to and from industrial or degraded areas.

From the desktop analysis the number of receptors is expected to be low as it mainly includes motorists driving on the access road to and from Venetia Mine and private lodges and game ranches. Motorists could also be traveling to Musina, although the R 572 located further north will be the more common road to use. Receptor sensitivity will vary between high (tourists traveling to lodges) to low (workers/contractors traveling to and from the mine).

4.5.1.13 Potential key viewpoints

Potential key viewpoints which will be confirmed during the site visit includes:

- Views along the Venetia Mine access road;
- Views from private lodges and game ranches from where the proposed infrastructure could possibly be visible; and
- Views from smaller dirt roads traversing the Study Area.

4.5.2 Assessment of Potential Impacts, including cumulative impacts and the no-go alternative

Based on the outcome of the desktop assessment the following key landscape and visual impacts are predicted to occur and should be addressed during the EIA phase:

- Changes to the landscape character and sense of place;
- Visual intrusiveness of the proposed 132kV transmission lines;
- Potential change of views from the Venetia Mine access road, private lodges and game ranches within the vicinity of the site;
- The ability of the landscape to visually absorb the proposed infrastructure;
- The visibility and presence of the cleared PV facility and associated infrastructure including possible glint and glare and industrialisaiton of the views;
- Visibility of lighting associated with the project; and
- The extension of the cumulative effect of industrial/mining type development within the landscape.

4.5.3 Proposed mitigation measures

- To reduce visual intrusion, fences must be of a robust mesh type. Shiny galvanized or white coloured fencing must be avoided for permanent security fencing around infrastructure areas. Where practically feasible, the security fence must be offset between any road and a 10m green buffer zone must be kept in place to shield receptors from the security fencing;
- Set the development back as far as practically possible from the Venetia Mine access road and plant a buffer strip of indigenous low growing shrubs between the road and the proposed development to minimise the effects of glint and glare;
- Install low level lighting or limit mounting heights of lighting fixtures by utilising footlight or bollard level lights. The use of high light masts and high pole top security lighting should be avoided along the security fence of infrastructure areas. Any high-level masts should be covered to reduce glow and light spillage;
- Use minimum lumen or wattage in light fixtures, where possible and practical;
- Up lighting of structures must be avoided where possible, with lighting installed downward angles that provide precisely directed illumination beyond the immediate surroundings of the infrastructure, thereby minimising the light spill and trespass;
- All buildings must have “full cut off” light fixtures that direct light only below the horizontal;
- Use low pressure sodium lamps, yellow Light Emitting Diode (LED) lighting, or equivalent to reduce sky glow. (Bluish white lighting is more likely to cause glare);

- Make use of motion detectors on security lighting at office and Operations and Maintenance Building;
- Building walls must be painted in darker colours such as khaki brown, grey brown or olive green;
- Steel roof sheets must be a dark colour such as khaki brown, grey brown or olive green;
- Reduce the visual contrast by avoiding bright and light colours like red, blue, and orange for ancillary infrastructure;
- Make use of existing access roads and dirt tracks so that it minimizes modification of the existing topography; and
- Solar facilities should be sited and designed to ensure that glint and glare do not have significant effects for users of the existing main road and air strip;
- Material stockpiles must not be higher than 3m;
- Construction signage should not be obtrusive and should not be seen against the skyline;
- Fences around construction camps should be black and of a robust mesh like material;
- Only the bigger tree species and/or individuals potentially causing problems with the transmission line/s should be removed. i.e., it is not necessary to clear/ fell the access route beneath the transmission line or the servitude;
- Vegetation clearance along the construction footprint of the servitude must be minimized by fencing off the work area and restricting vehicular access outside this area;
- Laydown areas must not be directly next to the Venetia mine access road (there should be a 10m vegetation buffer between any road and laydown area);
- After the construction phase, the areas disturbed that are not earmarked for operational purposes (part of infrastructure footprint) must be suitably rehabilitated;
- Trees and shrubs must be planted in clumps, (mimicking natural vegetation openings) and not in rows or other geometric shapes;
- Construction activities should be restricted to daylight hours as far as possible, to limit the need to bright floodlighting and the potential for sky glow;
- Avoid the complete removal of vegetation beneath the solar collector arrays, if vegetation can safely be left beneath the array and does not interfere with facility construction, operation, or maintenance, colour contrasts associated with exposed or eroded soils can be reduced Where it is not feasible to leave existing vegetation due to construction, safety, or operational concerns, post-construction revegetation should be considered, consistent with facility operations and safety considerations;
- The Contractor shall not deface, paint, damage or mark any natural feature (e.g., rocks, etc.) situated on or around the site for survey or any other purposes unless agreed beforehand.
- Maintaining as much of the natural vegetation on the ground within the development footprint as practically feasible (vegetation under collector arrays may need periodic maintenance to maintain an acceptable height).

4.5.4 Conclusion

Based on the following criteria the need for visual input is required:

- The receiving environment, the proposed PV plant is in close proximity to various private nature reserves and falls within the 2009 Mapungubwe Cultural Landscape World Heritage Site (MCLWHS) buffer zone;
- The nature of the proposed development which will result in a change in the existing land use and lead to possible intrusion in the landscape.

According to the MCLWHS Environmental Management Framework (EMF) relevant specialist studies (of which visual form part of) will need to be conducted to allow for informed and balanced decision making within the MCLWHS buffer zone.

The landscape and visual assessment report will serve to identify key concerns or issues relating to potential landscape and visual impacts arising from the proposed PV solar energy facility and to determine the boundaries and parameters for landscape and visual input during the EIA phase.

4.6 IMPACT OF HAZARDOUS SUBSTANCES

Hazardous substances would be stored on site during the construction and operational phases. These substances may include amongst other things, hydrocarbons (i.e. fuel), curing compounds, shutter oil, and cement. The use of hazardous substances at a site is controlled by various pieces of legislation, in particular the Hazardous Substances Act (No 15 of 1973) and the National Environmental Management Waste Act (No 59 of 2008). Based on other similar PV plant projects, it is anticipated that less than 80 m^3 of fuel and lubrication oil would be stored on site. This volume falls well below the triggers for listed activities in terms of NEMA. However, the necessary precautionary measures would be in place and will be included in the EMPr with the EIR.

4.6.1 Description of the Baseline Conditions

The preferred site is currently vacant and functions as part of the nature reserve, except for the infrastructure that is proposed to be constructed within the Venetia Diamond Mine boundary. No chemicals are currently used on the site.

4.6.2 Assessment of Potential Impacts, including cumulative impacts and the no-go alternative

Potential impacts associated with hazardous substances would occur throughout the life cycle of the proposed project, during the construction, operation and decommissioning phases. The potential impacts discussed below are applicable to and are the same for all alternative sites.

The volume of chemicals to be stored on site falls below the triggers of listed activity in terms of NEMA. However, the necessary precaution measures will be in place and included in the EMPr. The potential impact of spillages is of low magnitude, site-specific in extent and long-term and therefore of minor significance without mitigation. With the implementation of mitigation measures this would reduce to negligible significance. No difference in impact significance would result from the proposed alternatives.

Activities involving the use of hazardous substances can contaminate and reduce water quality. Topography, soil type and vegetation can affect the amount of contamination that occurs. Runoff from land can carry contaminants into streams, rivers, dams and aquifers. However, given the topography, limited rainfall and absence of surface water most of the year, it is unlikely that cumulative impacts would be significant. The potential impact is predicted to be of negligible without and with mitigation. This aspect will be further assessed during the next phase of the EIA process.

The no-go alternative will have a neutral impact as the status *quo* will remain.

4.6.3 Proposed Mitigation Measures

The management and protection of the environment would be achieved through the implementation of the EMPr (to be appended to the EIR), which, *inter alia*, specifies the hazardous compounds and the emergency procedures to follow in the event of a spillage.

Typical mitigation measures include storage of the material in a bunded area, with a volume of 110% of the largest single storage container or 25% of the total storage containers whichever is greater, refuelling of vehicles in designated areas that have a protective surface covering and utilisation of drip trays for stationary plant.

4.6.4 Conclusion

Either of the proposed site alternatives (including associated infrastructure) may proceed. Provided that hazardous chemicals are stored in dedicated storage facilities according to legal requirements, neither of the alternative sites presents any higher risk in terms of outcomes in the event of a spillage, since both sites have similar topography and drainage.

4.7 NOISE IMPACTS

dB Acoustics was appointed as the noise specialists to conduct a noise impact assessment. The findings of this assessment are summarized in the sections below. For the full assessment, refer to Annexure E5.

4.7.1 Description of the baseline conditions

There are residential land uses (farmhouses and/or lodges) and the Venetia Mine in the vicinity of the project area with the nearest lodge (Corea) some 2km to the west of the proposed project. Traffic noise, distant mining activities, domestic type noises and agricultural activity noises contribute to the prevailing ambient noise level of the study area. No environmental noise monitoring programmes are currently in place for the project and a monitoring programme will be designed to conform to the proposed noise management plan for the proposed solar farm.

The key environmental sensitivities of the area in terms of noise will be at the proposed PSEF project area and at the abutting noise-sensitive areas. The environmental noise survey will be conducted at the following measuring points which is illustrated in Figure 4-18.

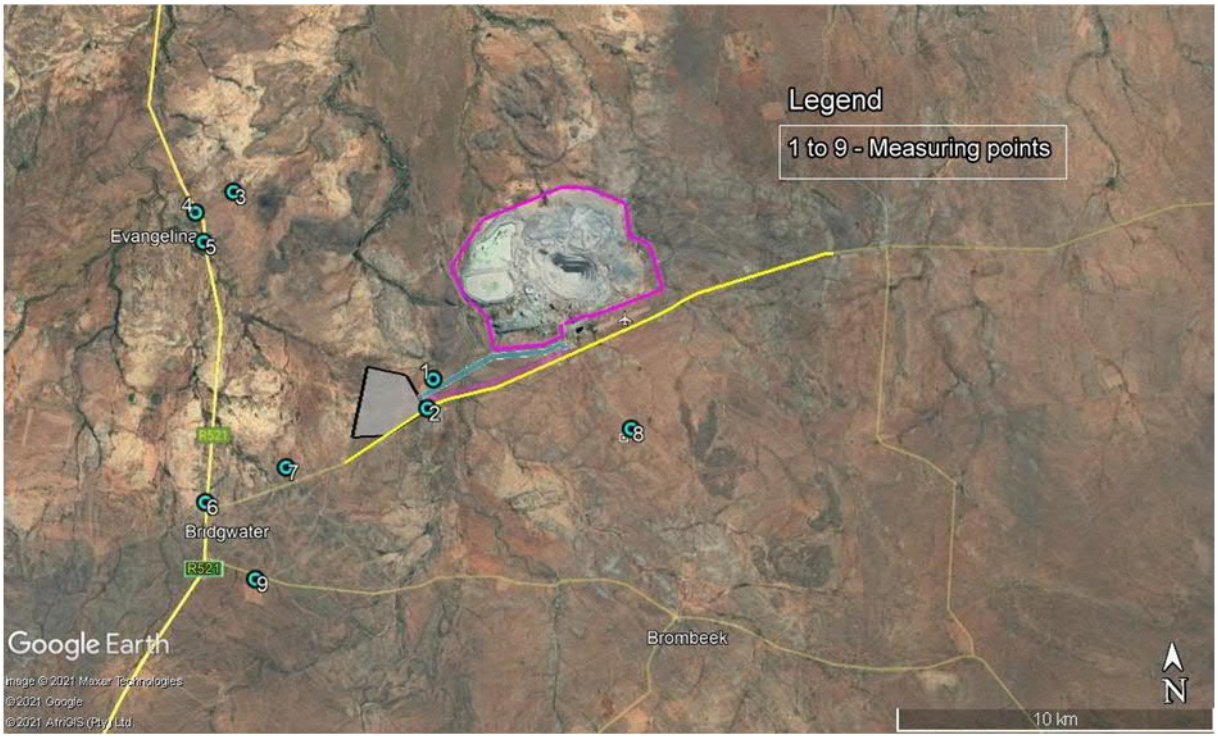


Figure 4-18: Proposed noise measuring points

4.7.2 Assessment of Potential Impacts, including cumulative impacts and the no-go alternative

Potential noise impacts which may be associated with the project, and which must be further investigated as part of the specialist investigations and environmental noise impact assessment phase:

Construction phase
- Civil construction;
- Removal of topsoil;
- Construction of solar panels;
- Infrastructure construction; and
- Increased traffic.

Operational phase
- Generation of power;
- Substation and/or switch yard operation;
- Additional traffic to and from the solar farm; and
- Overhead transmission line noise.

The preparation and provision of infrastructure for the proposed SEF will be the main noise sources during the construction phase, which may have a cumulative impact on the environment. During the operational phase the new project activities will be insignificant except for the noise from the substation, inverter and overhead powerline (corona noise during humid conditions), which may have a cumulative impact on the ambient noise levels in the study area. This will be assessed during the EIA process. Rehabilitation activities during the decommissioning phase may have a temporary impact on the noise environment.

4.8 CUMULATIVE IMPACTS

The only large-scale project within a 20km radius of the proposed SEF is Venetia Mine itself. This is currently an opencast operation, but is planned to be expanded with underground works. It will be confirmed what the proposed mine expansion will entail during the EIA phase, and cumulative impacts to which the expansion would contribute will accordingly be considered.

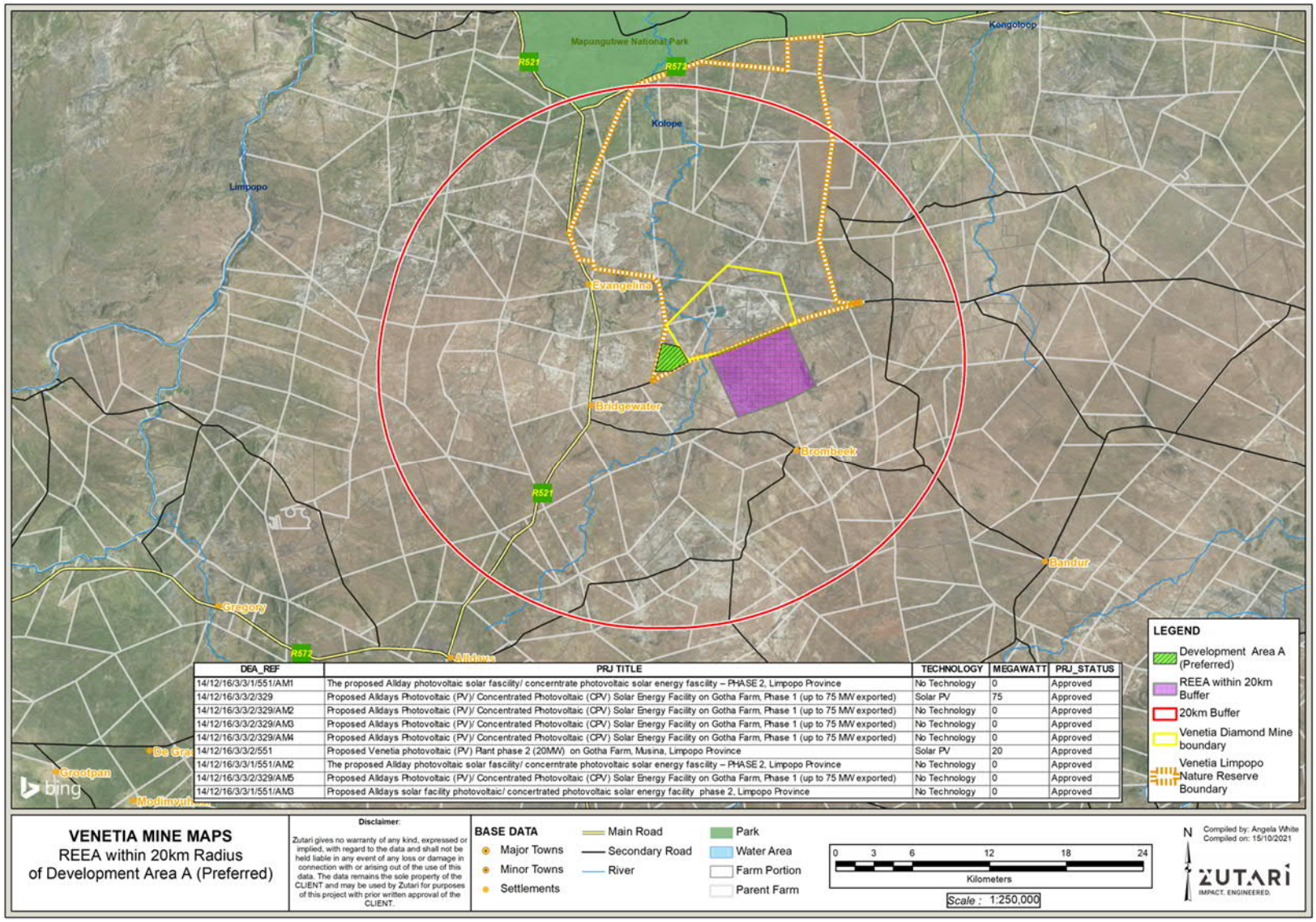
At the time of preparing this Scoping Report, one other renewable energy application (and amendment applications for the same project) had been authorised within 20km of the proposed site, as shown in Figure 4-19. This is based on information from the South Africa Renewable Energy EIA Applications database of the DFFE[12]. This database shows details for the authorised renewable energy applications as indicated in the table below but does not confirm whether it has been constructed. It is known that this application was submitted in response to the Renewable Independent Power Producer Programme (REIPPP) in 2012. No commencement of construction has occurred since then, and it is assumed that this project will not be constructed. Recent satellite imagery does not show any construction or site clearance on that site, although the authorisations of these facilities were granted in 2010 and 2013.

[12] https://portal.environment.gov.za/portal/apps/webappviewer/index.html?id=1c45081a7f65490c9ce58fad88e3b9e3 – accessed on 3 November 2020

Table 4-11 Known renewable energy projects authorised within a 20km radius of the proposed project

Authorisation name	The proposed Alldays photovoltaic solar facility / concentrate photovoltaic solar energy facility
Distance from proposed Venetia PV project	1km
Technology	Solar PV
Generation capacity	75 MW
Authorisation status	Authorised (Amendment)
Application receipt	July 2015

The current status of the Alldays Photovoltaic Facility will be confirmed. However, based on current information, this project appears unlikely to be implemented and would probably not contribute to cumulative environmental or social impacts.



DEA_REF	PRJ TITLE	TECHNOLOGY	MEGAWATT	PRJ_STATUS
14/12/16/3/3/1/551/AM1	The proposed Allday photovoltaic solar fascility/ concerntrate photovoltaic solar energy fascility – PHASE 2, Limpopo Province	No Technology	0	Approved
14/12/16/3/3/2/329	Proposed Alldays Photovoltaic (PV)/ Concentrated Photovoltaic (CPV) Solar Energy Facility on Gotha Farm, Phase 1 (up to 75 MW exported)	Solar PV	75	Approved
14/12/16/3/3/2/329/AM2	Proposed Alldays Photovoltaic (PV)/ Concentrated Photovoltaic (CPV) Solar Energy Facility on Gotha Farm, Phase 1 (up to 75 MW exported)	No Technology	0	Approved
14/12/16/3/3/2/329/AM3	Proposed Alldays Photovoltaic (PV)/ Concentrated Photovoltaic (CPV) Solar Energy Facility on Gotha Farm, Phase 1 (up to 75 MW exported)	No Technology	0	Approved
14/12/16/3/3/2/329/AM4	Proposed Alldays Photovoltaic (PV)/ Concentrated Photovoltaic (CPV) Solar Energy Facility on Gotha Farm, Phase 1 (up to 75 MW exported)	No Technology	0	Approved
14/12/16/3/3/2/551	Proposed Venetia photovoltaic (PV) Plant phase 2 (20MW) on Gotha Farm, Musina, Limpopo Province	Solar PV	20	Approved
14/12/16/3/3/1/551/AM2	The proposed Allday photovoltaic solar fascility/ concerntrate photovoltaic solar energy fascility – PHASE 2, Limpopo Province	No Technology	0	Approved
14/12/16/3/3/2/329/AM5	Proposed Alldays Photovoltaic (PV)/ Concentrated Photovoltaic (CPV) Solar Energy Facility on Gotha Farm, Phase 1 (up to 75 MW exported)	No Technology	0	Approved
14/12/16/3/3/1/551/AM3	Proposed Alldays solar facility photovoltaic/ concertrated photovoltaic solar energy facility phase 2, Limpopo Province	No Technology	0	Approved

Figure 4-19 | Renewable energy developments (all technologies) with an environmental authorisation from the DFFE. The red circle indicates a 20km buffer. The purple block is the only renewable energy project within 20km of the proposed site.

4.9 POTENTIAL IMPACTS IDENTIFIED BY THE NATIONAL WEB-BASED SCREENING TOOL

The proposed site has been subjected to a screening according to the national web-based screening tool of the DFFE (https://screening.environment.gov.za/screeningtool/#/pages/welcome).

This tool identified the potential restrictions and sensitivities on the site as shown in Table 4-12. Zutari's response to these identified themes, based on its own site visit and specialist studies already conducted during site alternative screening assessments and specialist scoping investigations is provided in the third column.

Table 4-12 Environmental sensitivities according to the National Screening Tool

Incentive, restriction or prohibition	Detail of incentive, restriction or prohibition	Implications for the Scoping and EIR process / motivation for not including an identified specialist study
Strategic Transmission Corridor	The site falls within the "International" Strategic Transmission Corridor between South Africa and Zimbabwe. The Strategic Transmission Corridor aims to facilitate faster than normal environmental authorisation applications for large scale transmission and distribution infrastructure. Facilities that trigger Activity 9 of Listing Notice 2 are only required to undergo a Basic Assessment Process.	This does not apply to the proposed development, since the proposed transmission lines will have a maximum capacity of 132 kV.
Protected areas and conservation areas		
South African Protected Areas	The site falls within the Mapungubwe Cultural Landscape World Heritage Site, which is identified in the South Africa Protected Areas Database (SAPAD)	It is recommended that the management authority of the Mapungubwe Cultural Landscape, the South African Heritage Resource Agency (SAHRA) and the Limpopo Heritage Resources Authority (LHRA) be consulted during the EIA process. A Heritage Impact Assessment is included in the EIA process.
South African Conservation Areas	The site falls within the Vhembe Biosphere Reserve, according to the South African Conservation Areas Database (SACAD).	Assess potential direct and indirect impacts on the Vhembe Biosphere Reserve (VBR) in the EIA process. Include the management authority for the VBR in stakeholder engagement in the EIA process.

Incentive, restriction or prohibition	Detail of incentive, restriction or prohibition	Implications for the Scoping and EIR process / motivation for not including an identified specialist study
Agriculture		
Agricultural theme: Medium sensitivity	According to the Screening Tool, both Site 1 and 2 have a medium agricultural sensitivity.	Taking the study area's status as a privately owned nature reserve into account, together with the close proximity to the existing Venetia Diamond Mine, and the poor availability of water, Zutari does not consider that either of the two site alternatives have the potential to be used for agriculture. Should the no-go alternative be approved then the site will remain as part of the nature reserve. The only feasible agricultural activity that the land would support is game farming. An agricultural land use and soils assessment is therefore not deemed necessary.
Biodiversity		
Animal species theme: High sensitivity	According to the DFFE Screening Tool, both parcels have a high sensitivity for animal species.	An assessment of fauna is included in the biodiversity impact assessment to be conducted as part of the EIA.
Aquatic Biodiversity theme: Very high	According to the DFFE Screening Tool, both parcels have a high sensitivity for aquatic biodiversity.	There is a river close to both parcels. Both sites fall within the regulated area of a wetland. There are also drainage lines present on both sites. An aquatic assessment is being conducted as part of the biodiversity impact assessment during the EIA.
Avian theme: High sensitivity	The Assessment Protocol for the Avian Theme applies to the Scoping and EIR process and indicates a "High" sensitivity.	An avian impact assessment is being conducted for inclusion in the biodiversity impact assessment for the EIA phase.
Bats theme: Low sensitivity	According to the Screening Tool, the site has a low sensitivity for bats. Since the proposed technology is solar PV, with no moving parts, it is not considered to be a physical risk to bats. However, the potential of disturbance to possible bat habitat will be assessed.	An assessment of bats and the potential impact to their habitat is being conducted as part of the biodiversity impact assessment for the EIA.

Incentive, restriction or prohibition	Detail of incentive, restriction or prohibition	Implications for the Scoping and EIR process / motivation for not including an identified specialist study
Plant species theme: Low sensitivity	The Assessment Protocol for plant species potentially applies to the Scoping and EIR process.	A botanical impact assessment forms part of the biodiversity impact assessment for the EIA.
Terrestrial biodiversity theme: Very high sensitivity	The Assessment Protocol for Terrestrial Biodiversity applies to the EIA process for both land parcels.	A terrestrial biodiversity impact assessment forms part of the biodiversity impact assessment for the EIA.
Heritage		
Archaeological and Cultural Heritage Theme: Low sensitivity.	According to the DFFE Screening Tool, both land parcels have low sensitivity.	A Heritage Impact Assessment is included in the EIA.
Palaeontology theme: High sensitivity	According to the DFFE Screening Tool, both land parcels have high sensitivity for palaeontology.	A palaeontological impact assessment is part of the Heritage Impact Assessment.
Other		
Civil aviation (solar PV) theme: Low and Medium sensitivity	According to the DFFE Screening Tool, the northern land parcel has a low sensitivity and the southern parcel has medium sensitivity to civil aviation.	It is recommended that no assessment for civil aviation is required for this application due low potential for negative impacts on civil aviation. However, the Civil Aviation Authority will be included as an interested and affected party to confirm whether they have any concerns with respect to the proposed PV facility.
Defence theme: Low sensitivity	According to the DFFE Screening Tool, both parcels have a low sensitivity for defence.	It is recommended that no assessment for defence is required for this application due to the low sensitivity.
Landscape (solar) theme: Very high sensitivity	The Assessment Protocol for the visual impact applies to the Scoping and EIR process.	A Visual Impact Assessment forms part of the EIA.
Radar Frequency Interference (RFI) theme: Medium sensitivity	The Assessment Protocol for "Site sensitivity verification requirements where a specialist assessment is required but no specific assessment protocol has been prescribed" potentially applies to the Scoping and EIR process. However, international research confirms that solar PV panels themselves do not cause any electromagnetic interference. "PV systems equipment such as step-up transformers and electrical cables are not	It is recommended that no assessment of RFI is required for this application.

Incentive, restriction or prohibition	Detail of incentive, restriction or prohibition	Implications for the Scoping and EIR process / motivation for not including an identified specialist study
	sources of electromagnetic interference because of their low frequency (60 Hz) of operation and PV panels themselves do not emit EMI. The only component of a PV array that may be capable of emitting EMI is the inverter. Inverters, however, produce extremely low frequency EMI similar to electrical appliances and at a distance of 150 feet from the inverters the EM field is at or below background levels. Also, proper inverter enclosure grounding, filtering, and circuit layout further reduce EM radiation."[13]	

4.10 POTENTIAL IMPACT SUMMARY

This Scoping Report provides an initial identification of the potential impacts of the SEF. These potential impacts were identified by the specialists and the EIA project team. Table 4-4 provides an overall summary of the potential impacts associated with the SEF, their likely significance (to be considered during the EIA phase) and in which phase of the project (construction, operation or decommissioning) they are expected to occur.

[13] https://www.nrel.gov/docs/fy17osti/67440.pdf

Table 4-13 Summary of potential impacts of the proposed Venetia SEF

Impact	Nature (+ or -)	Construction	Operation	Decommissioning
Terrestrial and aquatic biodiversity				
Loss of floral and faunal habitat	-	*Negligible to high* The level of impact depends on the layout of the preferred bidder. This is to be confirmed during the EIA phase.[14]		
Loss of floral and faunal diversity;	-	*Negligible to high* The level of impact depends on the layout of the preferred bidder. This is to be confirmed during the EIA phase.		
Impact on floral and faunal species of conservation concern	-	*Negligible to high* The level of impact depends on the layout of the preferred bidder. This is to be confirmed during the EIA phase.		
Increased sedimentation of watercourses due to soil erosion	-	*Negligible to high* The level of impact depends on the layout of the preferred bidder. This is to be confirmed during the EIA phase.	*Negligible to high* The level of impact depends on the layout of the preferred bidder and management measures to protect the soil. TBC during EIA phase.	
Impact of glare on bird species	-		This is to be confirmed during the EIA phase.	
Impacts on heritage resources				
Potential destruction of graves	-	*High* (High consequence but low probability). EIA phase investigation to confirm whether graves are present.		
Destruction of other heritage resources (e.g.	-	*Low* According to the Heritage Impact Assessment, impact on these resources can be avoided.		

[14] Ecologically sensitive areas that are identified during the EIA process will be provided to all IPP bidders to ensure that they are able to adapt their layouts to avoid significant impacts. Assuming they follow this advice, the impacts will be of low significance.

Impact	Nature (+ or -)	Construction	Operation	Decommissioning
farmsteads, dams, irrigation canals)				
Social impacts				
Local and national economic opportunities	+	*Moderate* Direct impacts would include the creation of new jobs for construction workers and the associated income generated by the solar project. Indirect and induced impacts would occur because of the new economic development and would include new jobs at businesses that support the expanded workforce or provide project materials, and associated income.	*Low* Only a limited number of people will benefit during the operational phase.	*Moderate* A slightly higher number of opportunities are predicted the decommissioning phase when compared to the operational phase.
Employment and skills transfer	+	*Low* In additional to employment, the proposed development also holds the potential for skills transfer. It must be noted that not all these employment opportunities are necessarily available for employment of local workforce within the immediate surrounds of the project.	*Very low* Only a limited number of people will benefit during the operational phase.	*Low* A slightly higher number of opportunities are predicted the decommissioning phase when compared to the operational phase.
Environmental impacts with a social dimension	-	*Moderate* Social impacts experienced in the physical environment relate to exposure to dust, noise, odour, vibration, traffic, artificial light etc. The impacts related to the quality of the living environment refer to how appropriate, from a social point of view, the study area is to live in.	*Very low* Most of the predicted impacts related to social dimension will not occur in the operational phase.	*Moderate* The decommissioning phase is predicted to cause many of the same impacts as the operational phase.
Safety and security	-	*Moderate* Farm safety is a concern in rural South Africa, and movement of people during the construction phase will make it easier for opportunistic criminals to enter the area without being noticed. Although crime is low in the area, stock theft has increased. Other potential concerns are the safety of construction material and infrastructure and improper conduct by security personnel. .	*Low* The operational phase is predicted to lower the risk of opportunistic criminals to enter the area as the movement in and out of the PV plant area will be far lower and more controlled.	*Moderate* Decommissioning will increase the movement of people as it can be considered similar works to the construction phase.
Traffic impacts	-	*Moderate* During construction there may be an increase in construction vehicles to the area that may cause traffic		

Impact	Nature (+ or -)	Construction	Operation	Decommissioning
		to slow down which may cause impatience and reckless behaviour in other road users.		
Generation of renewable energy	+		*High* This is a positive impact that will alleviate pressure on the national electricity grid.	
Expectations	-	*Moderate* Local communities and municipalities may have expectations in terms of employment, procurement, local ownership, socio-economic development, and local electricity provision.		
Water allocation	-	*Moderate* Water is a scarce resource in the area, and there may be concerns about a reduced availability of water due to the water needs of the solar facility.	*Low* The PV plant is not expected to use water for operational needs other than that of human consumption.	
Impact of hazardous substances				
Contamination of soil and water	-	*Low*, assuming that all legal requirements for storage and handing are followed.		
Cumulative impacts from other renewable energy projects				
Low. At the time of preparing this Scoping Report, one other renewable energy application (and various amendment applications for the same project) had been authorised within 20km of the proposed site. Based on their locality, limited size (maximum 75 MW) and intervening topography and infrastructure, cumulative impacts are expected to be negligible. These cumulative impacts are to be confirmed during the EIR phase once it is known whether the authorised plant in the vicinity is likely to be constructed and what its authorised layout is. The only other large scale development within a 20km radius of the proposed SEF is Venetia Mine itself. The current impact of the Venetia Mine must be considered with respect to cumulative impacts. The cumulative impacts include the physical footprint of disturbance related to the mine being extended by the size of the proposed project. On the other hand, the carbon footprint of the mine will be improved by making use of renewable energy instead of energy produced by coal-fired power stations.				

5 PUBLIC PARTICIPATION

In terms of Section 41 of the EIA Regulations (2014) a call for open consultation with all I&APs at defined stages of the EIA process are required. This entails participatory consultation with members of the public by providing an opportunity to comment on the proposed project. The PPP has thus incorporated the legislated requirements.

Consultation with the public forms an integral component of this investigation and enables I&APs (e.g. directly affected landowners, communities, national-, provincial- and local authorities, environmental groups, civic associations), to identify their issues and concerns relating to the proposed project and its associated activities. The PPP is structured to provide I&APs with an opportunity to gain more knowledge about the proposed project, to provide input through the review of documents/reports, and to voice any issues of concern at various stages throughout the EIA process.

The objectives of the PPP are to provide information to the public, identify key issues and concerns at an early stage, respond to the issues and concerns raised, provide a review opportunity, and to document the process properly. The PPP will be managed to meet these objectives throughout the EIA. The PPP undertaken to date is summarised in the table below.

5.1 PUBLIC PARTICIPATION PROCESS

The 30-day comment period for the Scoping Report will run from 12 November 2021 and 12 December 2021.

Table 5-1 | Summary of the PPP to be followed

Task	Details
I&AP identification	An I&AP database has been developed for the project by establishing the jurisdiction of organisations, individuals, farmers , businesses and others in proximity to the project site or with an interest in the proposed development. The database of I&APs will include at least landowners, adjacent landowners, traditional authorities, relevant district and local municipal officials, relevant national and provincial government officials, farmers, conservation management authorities and other relevant organisations. This database will be augmented via chain referral during the EIA process and will be continually updated as new I&APs are identified throughout the project lifecycle.
Site notices	Site notices with a size of 600 mm x 420 mm will be erected to inform the general public of the proposed project and the PPP around the site. Photos of these notices will be provided in the scoping report after public review. Non-technical summaries of reports (in English, Tsivenda and Sepedi) will be provided together with the site notices.
BID distribution and notifications	A non-technical Background Information Document (BID) will be developed and translated into two local languages, namely Tshivenda and Sepedi. The BID contains non-technical information and location maps of the proposed project, an invitation to register as an I&AP and to submit comments, and the dates of the 30-day comment period. English BIDs will be distributed via email to I&APs with access to email, such as commenting authorities, or in the local language of known. These BIDs will be distributed along with the notification that the EIA-process commences. BIDs in the local languages will be distributed accordingly in hardcopy during meetings. Emails will be sent to identified I&APs, notifying them of the availability of the BID for the proposed project for perusal and comment. Authorities and I&APs will be provided 30 days within which to register and submit initial comments on the proposed project. BIDs and invitations to comment will also be distributed to community leaders, tribal authorities and other community structures. Notifications will also be sent via SMS and Whatsapp to stakeholders on De Beers' stakeholder lists.
Newspaper advertisements	Two advertisements will be placed in local newspapers (the Limpopo Mirror and Zoutpansberger) during the comment period as notification of the availability of the DSR. These advertisements will also be included in the De Beers newsletters and relevant existing media. Proofs of the advertisements will be included in the SR after public review.
Notification of availability of Scoping Report for comment	I&APS will be notified of the availability of the Draft Scoping Report (DSR) via email, telephonic call, and/or WhatsApp as appropriate. To reduce the risk of COVID-19 transmission, no physical copies of the Scoping Report will be provided for comment. Instead, the Scoping Report will be provided digitally via the Zutari website (the link of which will be made available as part of the BID and notification) or a file sharing platform such as Google Drive. Hard copies of the Scoping Report's non-technical summary will be posted at the same venues as the site notices. I&APs without access to a computer or internet can be provided with a hard copy of the report upon request. Notifications of availability of the report will also be provided via the De Beers Connected Communities Survey (ULULA) SMS channel, which includes approximately 2000 I&APs.Community members who do not have access to electronic media may provide their comments via a physical community "dropbox", which is normally used for submission of CVs.
Meetings and Key Stakeholder Workshops	Face-to-face or virtual meeting will be held during the scoping phase, where possible, with: ► Neighbouring landowners via a key stakeholder workshop at or near the mine; ► Blouberg and Musina Local Municipality Community Engagement Forums (to coincide with monthly Forum meetings, if possible on 25 and 26 November 2021); and ► SANParks (as management authority of the Mapungubwe World Heritage Site) – meeting may be virtual, depending on location of responsible manager(s) ► Vhembe Biosphere Reserve Management - meeting may be virtual, depending on location of responsible manager(s)

Task	Details
Addressing comments received	All comments received will be included in the SR once the public review period has been completed. These comments will be collated into the Comments and Response Report (CRR), together with responses to these comments and submitted to the CA with the SR.
Authorities	Consultations will be held with the Competent Authority (LEDET) and the Department of Water and Sanitation to discuss the integration of the application for an Environmental Authorisation (EA) and Water Use Licence.

5.2 STAGES AT WHICH AUTHORITIES WILL BE CONSULTED

In terms of Sections 24 O (2) and (3) of the NEMA, the following state departments and/or parastatal bodies are intended to be included in the PPP and invited to comment on the proposed project:

- Parastatal organisations
  - Provincial Heritage Resources Agency of Limpopo
  - Eskom Distribution;
  - Civil Aviation Authority;
  - South African Heritage Resources Agency;
  - SANParks;
  - South African National Roads Agency Limited (SANRAL);
  - Roads Agency of Limpopo; and
  - National Energy Regulator of South Africa (NERSA).

- Local authorities
  - Vhembe District Municipality;
  - Musina Local Municipality;
  - Capricorn District Municipality; and
  - Blouberg Local Municipality

- National departments
  - Department of Water and Sanitation (DWS);
  - Department of Forestry, Fisheries and Environment, (DFFE);
  - Department of Transport (DoT);
  - Department of Mineral Resources and Energy (DMRE);
  - Other national/provincial departments, where deemed necessary.

As with all other I&APs, state departments and parastatal bodies will be provided with 30 days to comment on the Scoping Report.

6 CONCLUSIONS

This section briefly concludes the report and touches on a few key procedural aspects going forward.

In accordance with the requirements of the NEMA, this scoping process has reviewed a range of project alternatives and contemplated the array of potential environmental impacts associated with the following activities for Venetia Mine's proposed PV SEF.

6.1 ALTERNATIVES

In summary, the following alternatives have been considered in this Scoping Report. The alternatives highlighted in **bold** text are considered preferred and will be taken forward into the next phase of the EIA process, with detailed impact assessments to be conducted by the specialists for these preferred alternatives.

Table 6-1 | Details of the proposed alternatives

Alternative Type	Description
Location (site) alternatives	▶ Drumsheugh (preferred site) ▶ Regina (alternative site)
Layout alternatives	Layout alternatives for the preferred site will be explored in the EIA phase once the facility design of the preferred bidder is known. Site-specific layout alternatives will be explored to reduce the impacts on sensitive zones defined by specialist studies in the EIA phase.
Technology alternatives	Mounting alternatives: ▶ Fixed angle ▶ Single axis tracking ▶ Dual axis tracking
Routing alternatives for powerlines	▶ A 200m corridor from Drumsheugh to Venetia Mine (preferred) for two 132 kV powerlines ▶ Routing alternatives within the proposed 200m powerline corridor for the preferred site will be considered in the EIA phase based on specialist field assessments and identification of sensitivities and their buffer zones within these corridors.
The No-Go alternatives	▶ Solar energy generation via the proposed PV facility ▶ "No-go" alternative to solar energy production (no solar PV project)

6.2 POTENTIAL IMPACTS

The following potential impacts on the biophysical and socio-economic environment were identified and will be assessed in detail in the EIR:

- Impact on terrestrial biodiversity, including animals (birds and bats) and plants;
- Impact on aquatic biodiversity;
- Impact on climate change;

- Impact on heritage resources, including archaeological and palaeontological (fossil) resources;
- Impact on the social environment, including expectations for local employment and procurement and socio-economic development;
- Air quality (dust) impacts during construction;
- Traffic impacts during construction;
- Noise impacts during construction; and
- Visual impacts during construction and operation.

Desktop assessments and various field assessments by specialist have been undertaken, from which the potential impacts have been identified in Section 4. In-depth specialist impact assessments are being undertaken for these impacts and will be discussed and assessed in the EIR, which is the next phase of the EIA process.

Based on the outcome of the above-mentioned assessments which are/will be conducted according to the Plan of Study (PoS) for EIA (Annexure G), no additional studies are regarded to be necessary. It is the opinion of the EAP that the recommended specialist studies will effectively identify and assess the potential impacts that the proposed project may have on the receiving environment.

As can be seen in Table 4.4, the negative impacts with potentially the highest significance are:

- Potential destruction of graves (high consequence but low probability);
- Potential impact on aquatic biodiversity;
- Noise impacts;
- Traffic impacts;
- Environmental impacts with a social dimension;
- Social expectations; and
- Safety and security.

Positive impacts with potentially the highest significance are:

- Local and national economic opportunities;
- Employment and skills transfer; and
- Generation of renewable energy.

Negative impacts that are expected to have low significance are:

- Contamination of soil and water;
- Water allocation
- Destruction of other heritage resources

The significance of some impacts would need to be confirmed during the EIA phase, since project layouts / designs of the preferred bidder are not yet available. These impacts are:

- Loss of floral and faunal habitat;
- Loss of floral and faunal diversity
- Impacts on water resources / aquatic ecology;
- Impact on floral and faunal species of conservation concern
- Increased sedimentation of watercourses due to soil erosion
- Impact of glare on road safety

In addition to these assessments, if additional studies are required to address comments on the SR and Plan of Study for EIA, these studies will be included in the EIR.

The approach to the EIA Phase will be conducted in terms of the methodology in the Plan of Study for EIA as appended to this report.

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