

**PART 2 AMENDMENT APPLICATION OF THE
VANRHYNSDORP SOLAR PHOTOVOLTAIC
(PV) FACILITY ON PORTION 7 OF THE
REMAINDER OF THE FARM DE DUINEN NO.
258 NEAR VANRHYNSDORP WITHIN THE
MATZIKAMA LOCAL MUNICIPALITY IN THE
WESTERN CAPE PROVINCE**



Final
ENVIRONMENTAL IMPACT ASSESSMENT REPORT
D:FFE EA reference number: 14/12/16/3/3/1/1854/AM2

July 2023

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MUNICIPALITY IN THE WESTERN CAPE PROVINCE**

D:FFE EA Ref No.: 14/12/16/3/3/1/1854/AM1

**PREPARED FOR:
Roma Energy Vanrhynsdorp (Pty) Ltd.**

**7 Pin Oak,
Welgevonden, Stellenbosch,
Western Cape,
7600**

**PREPARED BY:
EnviroAfrica**

**P.O. Box 5367
Helderberg
7135
Tel: 021 – 851 1616
Fax: 086 – 512 0154**

EXECUTIVE SUMMARY

Introduction

The holder of the Roma Energy Vanrhynsdorp solar photovoltaic (PV) facility on Portion 7 of the Remainder of the Farm De Duinen No. 258 near Vanrhynsdorp within the Matzikama Local Municipality in the Western Cape Province Environmental Authorisation (EA) intends to lodge an amendment application.

The amendment applicant and holder of the Environmental authorisation is Roma Energy Vanrhynsdorp (Pty) Ltd. EnviroAfrica CC has been appointed by Roma Energy Vanrhynsdorp (Pty) Ltd as the independent Environmental Assessment Practitioner (EAP) responsible for undertaking the relevant Environmental Impact Assessment (EIA) and the Public Participation Process (PPP) required in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA).

Project description

Roma Energy Vanrhynsdorp (Pty) Ltd is proposing to amend the Vanrhynsdorp solar (PV) facility on Portion 7 of the Remainder of the Farm De Duinen No. 258 near Vanrhynsdorp within the Matzikama Local Municipality in the Western Cape Province EA (DFFE reference: 14/12/16/3/3/1/1854/AM1) from a generation capacity of 5 MW to 10 MW and to include a hydrogen plant.

The proposed property covers an area of 271.70 ha, of which approximately 20 ha will be developed for the hydrogen plant, PV array, consisting of either fixed or single axis tracking systems, and associated infrastructure, allowing for the generation of up to approximately 10 MW of alternating current.

The PV tables will be raised approximately 0.5 m off the ground and will not exceed 3 m in height at maximum tilt.

Underground electrical power lines transfer the generated electricity from the blocks of solar panels to 6 inverter/transformer stations within the development footprint. From these stations, the generated power of the solar block is conveyed through underground electrical power cables to the hydrogen plant and where else required.

The proposed electrolysis hydrogen plant will use electricity generated from the solar facility to split water into hydrogen and oxygen. The water will be obtained from boreholes on Portion 7 of the Remainder of the Farm De Duinen No. 258 for electrolysis. The produced hydrogen and a portion of the oxygen will be stored in separate containers. The hydrogen will be stored under high pressure in

containers. A portion of the oxygen will be processed, dried and stored (bottled) for re-sale. The remainder of the oxygen will be released into the atmosphere. The hydrogen facility will have a storage capacity of approximately 25 cubic meters. The storage duration will depend on the demand, ideally the containers will be sold and removed from the site on a daily basis. The electrolysis hydrogen plant and its associated structures will cover an area of approximately 0.8 ha within the 20 ha footprint.

Associated infrastructure includes the internal access roads, office buildings with ablutions, maintenance sheds, inverter-transformer stations on concrete pads, oxygen, water and battery storage banks/containers, construction and operational laydown area are also included. The entire site will be fenced off. The total development footprint will be less than 20 ha.

The inverter/transformer station, hydrogen plant and storage facilities will be located within the 20 ha footprint.

The site is located approximately 2.87 km North of Vanrhynsdorp and is adjacent to the N7. Access to the site is through gravel roads accessed from the R101 via the N1 or R45.

Site co-ordinates: Approximate central point: 31°34'46.02"S, 18°44'46.91"E.

Environmental Requirements

The National Environmental Management Act (Act 107 of 1998) (NEMA), as amended, makes provision for the identification and assessment of activities that are potentially detrimental to the environment, and which require authorisation from the relevant authorities based on the findings of an environmental assessment. NEMA is a national act, which is enforced by the Department of Forestry, Fisheries and the Environment (DFFE). These powers are delegated in the Western Cape to the Department of Environmental affairs and development planning (DEADP). In terms of Section 24C of NEMA, the national Department of Forestry, Fisheries and the Environment (DFFE) is the Competent Authority.

On the 04 December 2014 the Minister of Water and Environmental Affairs promulgated regulations in terms of Chapter 5 of the NEMA, namely the EIA Regulations 2014. These were amended on 07 April 2017 (GN No. 326, No. 327 (Listing Notice 1), No. 325 (Listing Notice 2), No. 324 (Listing Notice 3) in Government Gazette No. 40772 of 07 April 2017). Listing Notice 1 and 3 are for a Basic Assessment and Listing Notice 2 for a full Environmental Impact Assessment.

According to the regulations of Section 24(5) of NEMA, authorisation is required for the following listed activities and was obtained for the solar PV development (DFFE Reference 14/12/16/3/3/1/1854/AM1):

Government Notice R327 (Listing Notice 1) listed activities:

1(ii) The development of facilities or infrastructure for the generation of electricity from a renewable resource where-

- (i) *the electricity output is more than 10 megawatts but less than 20 megawatts; or*
- (ii) ***the output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare;***

Excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs:

- (a) *within an urban area; or,*
- (b) *on existing infrastructure.*

The authorised solar photovoltaic array with an electricity output of 5 MW and a footprint greater than 1 ha but not exceeding 20 ha will be amended to an electricity output of 10 MW and to include a hydrogen plant. The development will supply electricity to the hydrogen plant and where else required. The site is located outside an urban area or industrial complex. No exclusions apply.

27 The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for:-

- (i) *the undertaking of a linear activity; or;*
- (ii) *maintenance purposes undertaken in accordance with a maintenance management plan.*

The clearance of vegetation within the assessed 20 ha demarcated footprint has been authorised for the solar PV plant, including associated infrastructure. The amendment will be to include the hydrogen plant and associated infrastructure within the assessed 20 ha footprint. The vegetation that will be cleared will be greater than 1 ha but will not exceed 20 ha. No exclusions apply.

Need and Desirability

The growing demand for electricity in South Africa is well known and documented, and there is a need not only for additional energy generation to meet the demands of increasing economic growth and social development, but also for the incorporation of renewable energy.

The proposed amendment intends to avoid placing additional strain on the National grid by generating the required electricity for the hydrogen plant through the PV facility. The generated electricity will be used to power the hydrogen plant and where else required. The aim of the hydrogen plant is to provide a more sustainable source of fuel.

In 2021, the Matzikama Local Municipality had a total population of 72 759 and this included 21 172 households with an average household size of 3.8 people per household. (Source: Matzikama SEP 2021).

According to Stats SA, 2011, 55.7% of the households within the municipal area earned less than R3 500 per month and as indigent households, qualify for subsidized housing and free civil and electrical services provision.

In 2020, the municipal area had 26 057 employed workers. Of the employed workers, 20.9% were employed in the informal sector and 79.1% were employed in the formal sector. The majority of the formally employed people in the Matzikama municipal area consist of low-skilled workers, which represents 41.8% and semi-skilled workers, which represents 24.8% of the total formally employed workforce. The number of skilled workers who are formally employed amount to 12.5% of the total.

The Matzikama Local Municipality approximately contributed R4 470 million to the economy and GDP of the West Coast District. In 2020, the Agriculture Sector remained the largest contributor to the Matzikama Local Municipality's GDP with a figure of 25.1%. The Trade Sector's contribution, despite its contraction, remained the second largest contributor with a figure of 13.9%. This is then followed by the Finance Sector (13.3%), then the Manufacturing Sector (13%), then the General Government Sector (10.9%) and then the Community Services Sector (9.2%). The sectors that contributed the least were: the Transport Sector (5%), the Construction Sector (3.4%) and lastly the Electricity, Gas and Water Sector with 2%.

Though income disparity, and hence the poverty rate is high, the community is stable and resilient.

The site is located on the Remainder of the Farm De Duinen No. 258, approximately 3 km north of Vanrhynsdorp, adjacent to the N7.

Large parts of the property have been disturbed by past agricultural activities, mostly in the form of livestock grazing. The recent ongoing drought left its mark on the veld, and many plants within the study area and surroundings showed signs of being severely affected by the dry spell. The vegetation was described as a low open shrubland (< 0.5 m high), supporting a disturbed version of

Gannabosveld, dominated by *Salsola zeyheri* (Gannabos), and hardy *Mesembryanthemum* species. The plant species encountered was lower than expected, likely due to ongoing drought together with historic and present grazing practices.

The site is located in a topographical flat area, yet it is located on a plain rising 20m above the north of the settlement. The site slopes very slightly from the south-east towards the north-west. Elevation varies from 151 m (south-east corner) towards the north-west at 145 m with an average slope of 0.7% and an elevation loss of approximately 9 m.

The general area is ideally suited for a solar PV facility due to the relatively high irradiation levels. The Global Horizontal Irradiation (GHI) average for the area is 2104.8 kWh/m² according to the Global Solar Atlas. The Global Weather Corp defines GHI as a measurement of the total solar electromagnetic radiation above a horizontal surface at a given location and time. It is the most useful metric for predicting solar panel output. It accounts for 71.6% of PV performance variations.

The proposed facility is also overall aligned with the relevant policies at national, regional and local level.

The proposed amendment is not expected to significantly impact on people's health and well-being (e.g., in terms of noise, odours, etc.). The amendment of the facility will change the character of the area, but the small size of the development reduces the significance. Due to the distance from town, the impact is not significant. The area does not hold very unique or specific visual quality of high significance.

The cumulative impact is considered Low.

No limitations in terms of the Matzikama Local Municipality Spatial Development Framework (2020/21 to 2024/25), were found. Overall, the proposed development complies with the Spatial Development Framework (SDF) climate change directives.

Site Description

The site is located on the Remainder of the Farm De Duinen No. 258, approximately 3 km north of Vanrhynsdorp, adjacent to the N7. Access to the site is through gravel roads accessed from the R101 via the N1 or R45.

Large parts of the property have been disturbed by past agricultural activities, mostly in the form of livestock grazing. Ongoing drought has affected the veld, and many plants within the study area and

surroundings showed signs of being severely affected by the dry spell. The vegetation was described as a low open shrubland (< 0.5 m high), supporting a disturbed version of Gannabosveld, dominated by *Salsola zeyheri* (Gannabos), and hardy *Mesembryanthemum* species. The plant species encountered was lower than expected.

According to the Vegetation map of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006, as updated in the 2012 beta version and 2018 Final) the vegetation type expected on the proposed site is Vanrhynsdorp Gannabosveld (Least Concern).

According to biodiversity overlay maps from SANBI BGIS the site falls within an Ecological Support Areas (ESA1).

The DFFE Screening Tool Report identified the site as having a Very High Landscape (Solar) Theme and Terrestrial Biodiversity Sensitivity (**Appendix 5**).

The DFFE Screening Tool Report identified the site as having a Low Aquatic Biodiversity Sensitivity (**Appendix 5**).

Specialist Studies and findings

The following specialist inputs were included as part of this Environmental Impact Assessment for the proposed amendment:

- Terrestrial Biodiversity Assessment
- Heritage Impact Assessment
- Soil, Land use and Agricultural Potential Assessment
- Visual Impact Assessment
- Socio-economic Impact Assessment

Terrestrial

According to the Terrestrial Biodiversity Compliance Statement (**Appendix 4A**) unlikely that the proposed development will have a negative impact on any avifauna or biodiversity due to the small footprint of the proposed amendment activity.

Heritage

The NID for the proposed amendment (**Appendix 4B**) and Heritage Western Cape concluded that it is not foreseen that the proposed amendment will have a negative impact on heritage resources.

Soil, land-use and agricultural potential

According to the Soil, Land-use and Agricultural Potential specialist (**Appendix 4C**), the previous report's contents and findings are still applicable and can be applied as is for updated applications on the site that will have similar impacts. In this regard a solar facility with the added scope of adding a hydrogen plant within the assessed footprint will not incur any additional land and agriculture related impacts.

Visual

According to the Visual Assessment (**Appendix 4D**), the identified receptors were analysed and the finding was that none display a high visual significance and therefore the overall visual impact of the proposed project is low. Due to the low impact, no mitigation measures are required.

The cumulative impact of the project is low as only one other project of a similar extent, has been approved in the area and due to the vastness of the landscape, the cumulative impact is rated as low.

Conclusion

The specialist inputs and the information provided within the EIA Report, indicates that the proposed EA amendment of the Vanrhynsdorp solar (PV) facility on Portion 7 of the Remainder of the Farm De Duinen No. 258 near Vanrhynsdorp within the Matzikama Local Municipality in the Western Cape Province from 5 MW to 10 MW and to include a hydrogen plant does not pose any significant impacts and can be implemented with minimal mitigation required.

In terms of the need and desirability the proposed development aims to provide a long-term, cost-effective strategy to provide a more sustainable source of fuel and to help alleviate the electricity demand in South Africa, and with the objective of increased electricity generation through renewable sources.

The no-go alternative of the amendment will possibly result in reduced removal of vegetation or impacts on biodiversity (flora or faunal) or loss of agricultural land since the amendment will not take place. However, since the area is used for grazing, this does not guarantee that the natural vegetation and ecosystem as a whole will revive or continue to function undisturbed. According to the Terrestrial Biodiversity compliance statement (Appendix 4A), the No-Go Alternative for the proposed amendment will not result in significant gain in regional conservation targets, the conservation of rare & endangered species or gain in connectivity. The current EA also allows for the clearing of indigenous vegetation of less than 20 ha for the establishment of the 5 MW PV facility.

The no-go alternative for the proposed amendment will also result in that South Africa's unsustainable, coal-based electricity supply will not be augmented with renewable energy alternatives. The potential job opportunities during the construction and operational phases of the amendment development will also not be realised along with other social-economic benefits.

The No-Go Alternative would lose an opportunity for the region and Matzikama Local Municipality to generate alternative energy. Losing the opportunity will in turn have consequence such as:

- The loss of employment opportunities generated during construction and operations.
- The loss of economic opportunities including enhancement of small businesses and business tourism.

The No-Go alternative is not recommended by the Socio-economic Impact Assessment.

The Terrestrial Biodiversity compliance statement, in general concludes that the proposed development will result in the permanent transformation of less than 20ha of natural veld covered by a vegetation type that is considered least threatened. There are no special habitats within or near the proposed footprint that will be impacted by the development. It is highly unlikely that the proposed development will have any significant impact on protected or endangered fauna or flora and with good environmental control, the development is likely to result in a Low impact on the environment.

The Heritage notice of intent to develop for the proposed amendment identified no significant impact on the heritage resources. Accordingly, the proposed amended development of the 10 MW solar photovoltaic (PV) facility and hydrogen plant may continue.

The Terrestrial Biodiversity compliance statement concluded that the avifauna sensitivity rating with regards to this project should be considered low. No fatal flaws were discovered during the two on-site investigations. The development is supported by the Terrestrial Biodiversity compliance statement.

The Soil, Land-use and Agricultural Potential Survey concluded that the proposed development of a hydrogen plant and 10 MW photovoltaic facility on the site will not have a significant impact on Agriculture due to the low soil potential and limited rainfall of the site.

The visual impact is restricted to a small view catchment with very few potential receptors within the viewshed. The overall impact on these receptors are also low and therefore the visual impact can be regarded as low to insignificant.

From a socio-economic perspective, the positive impacts of the proposed solar facility will benefit the broader community whilst the negative impacts affect only some individuals or households. The proposed solar facility is deemed acceptable as it is:

- During construction, the generation of 30 jobs and a wage bill of R3.4 million over 6 months and R3 million benefitting the 27 locals, providing 15 unskilled, 10 semi-skilled and 2 skilled people employment.
- During operations, the generation of 3 jobs, and a wage bill of R14 million for the first ten years of which R13 million will benefit locals and R1 million per annum is spend.
- During decommissioning, the creation of 9 jobs but 30 people employed with a wage bill of R2.3 million over 4 months and R2 million benefitting the locals, providing 17 unskilled and 11 semi-skilled and 2 skilled local people employment opportunities and contributing <1% to the Matzikama GDP;

As the positive impacts are more beneficial to the broader community, the proposed solar and hydrogen facility amendment is recommended from a socio-economic perspective.

Considering all the information, it is not envisaged that this proposed EA amendment of the Vanrhynsdorp solar (PV) facility on Portion 7 of the Remainder of the Farm De Duinen No. 258 near Vanrhynsdorp within the Matzikama Local Municipality in the Western Cape Province will have a significant negative impact on the environment, and the socio-economic benefits are expected to greatly outweigh any negative impacts.

It is therefore recommended that the proposed EA amendment of the Vanrhynsdorp solar (PV) facility on the Remainder of the Farm De Duinen No. 258 be supported and be authorised with the necessary conditions of approval, subject to the implementation of the recommended mitigation measures.

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Appendix 3A: Locality maps

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appendix 4A: Terrestrial Biodiversity Compliance Statement

appendix 4B: Heritage assessment (Notice of Intent to Develop)

appendix 4C: Soil, land use and agricultural potential

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appendix 4E: Socio-economic impact assessment

Appendix 5: DFFE Screening tool

Appendix 6: Environmental Management Programme

Appendix 7: Applicability checklist response

Appendix 8: WULA status

Appendix 9: Certified copies of the EA's

ACRONYMS

AIA	Archaeological Impact Assessment
ACRM	Agency for Cultural Resource Management
BESS	Battery Energy Storage System
BGIS	Biodiversity Geographic Information System
CA	Competent Authority
CARA	Conservation of Agricultural Resources Act (Act No. 43 of 1983)
CBA	Critical Biodiversity Area
DFFE	Department of Forestry, Fisheries and the Environment (Competent Authority)
DWS	Department of Water and Sanitation
EAP	Environmental Assessment Practitioner
ECA	Environment Conservation Act (Act No. 73 of 1989)
EIA	Environmental Impact Assessment
EIR	Environmental Impact Report
EMPr	Environmental Management Programme
ESA	Ecological Support Area
EWR	Environmental Water Requirements
GDP	Gross domestic product
GGP	Gross Domestic/ Geographical Product
GHI	Global horizontal irradiance
HIA	Heritage Impact Assessment
I&APs	Interested and Affected Parties
LTMS	Long-Term Mitigation Scenario
LSA	Later Stone Age
MSA	Middle Stone Age
NEMA	National Environmental Management Act (Act No. 107 of 1998)
NEMBA	National Environmental Management: Biodiversity Act (Act No. 10 of 2004)
NHRA	National Heritage Resources Act (Act No. 25 of 1999)
NID	Notice of Intent to Develop
NWA	National Water Act
OESA	Other Ecological Support Area
PIA	Palaeontological Impact Assessment
PV	Photovoltaic
SAHRA	South African Heritage Resources Agency
SANBI	South African National Biodiversity Institute
SCC	Species of Conservation Concern
SDF	Spatial Development Framework
SEF	Solar Energy Facility
SIA	Socio-economic Impact Assessment
SPLUMA	Spatial Planning Land Use Management Act (Act No. 16 of 2013)

SSVR	Site Sensitivity Verification Report
VIA	Visual Impact Assessment
WULA	Water Use Licence Application

1. INTRODUCTION

Consideration is being given to amend the Roma Energy Vanrhynsdorp EA from 5 MW PV to 10 MW PV generation capacity and to include the development of a hydrogen plant on Portion 7 of the Remainder of the Farm De Duinen No. 258 near Vanrhynsdorp within the approved 20 ha footprint.

The EA holder and amendment applicant is Roma Energy Vanrhynsdorp (Pty) Ltd. who will undertake the amended activity should it be approved. EnviroAfrica CC has been appointed by Roma Energy Vanrhynsdorp (Pty) Ltd. as the independent Environmental Assessment Practitioner (EAP) responsible for undertaking the relevant amended EIA and the Public Participation Process required in terms of the National Environmental Management Act (Act 107 of 1998) (NEMA).

1.1 SCOPE OF WORK

There has been no particular brief given to the consultants to undertake this study. However, the scope of the study has been determined with reference to the requirements of the relevant legislation and undertaken in terms of the Integrated Environmental Management Information series on Environmental Impact Reporting (2004) issued by Department of Environmental Affairs.

The basic scope of work will include the following:

- Review of all information.
- Participating in the progress of the development amendment proposal.
- Assessment of anticipated impacts associated with the proposed change.
- Identification of suitable mitigation measures to reduce negative impacts and enhance positive impacts associated with the proposed change.
- Submission for decision.

One of the crucial aims of the EIA for the proposed amendment is to ensure that the demands of sustainable development are met on a project level, within the context of the greater area. The most common definition of sustainable development is development that meets the needs of the present while not compromising the needs of future generations.

This EIA for the proposed amendment is therefore being undertaken with sustainable development as a goal. The assessment will look at the impacts of the amendment proposal on the environment and assess the significance of these, as well as propose mitigation measures, if required, to reduce anticipated impacts to acceptable levels.

1.2 ASSUMPTIONS AND LIMITATIONS

The assumption is made that the information on which the report is based (i.e. specialist studies and project information) is correct.

Future management of the site is essential, and the assumption is made that the mitigation measures recommended by the specialists will be implemented on a long-term basis for the proposed amendment. This has a major bearing on the reliability of the predictions of significance of impact.

1.3 DESCRIPTION OF THE APPROVED ACTIVITY

The environmental authorisation is for the construction of the Vanrhynsdorp Solar Photovoltaic (PV) Facility on the remainder of the farm De Duinen No. 258, within the Matzikama Local Municipality in Western Cape Province hereafter referred to as "the property".

The project entails the establishment of an array of crystalline solar photovoltaic (PV) modules, together with associated infrastructure for the generation of 5MW of electricity. The total development footprint including other infrastructure will occupy more than 10ha, but less than 20ha. The proposed development will comprise of 18540 array of poly-crystalline solar PV modules grouped into tables or panels of 20 modules each. The PV tables will be raised approximately 500mm above ground level and will have single axis tracking systems allowing the generation of approximately 5MW which will be evacuation to the national electricity grid.

The PV facility will comprise the following:

- Solar arrays which would generate approximately 5MW and cover an area of 10ha (within the total 20ha site);
- 20ha demarcated footprint, surrounded by a perimeter fire access road and fence;
- Fenced construction staging area (within the 20ha total site area);
- A 3m X 6m maintenance shed (within the 20ha total site area);
- Three inverter-transformer stations on concrete pads (which form part of the 10ha footprint of the actual solar array);
- A switch panel for connection to the power grid; and
- An office with septic tank ablutions (footprint of approximate 450m²)

1.4 DESCRIPTION OF THE PROPOSED AMENDMENT ACTIVITY

Roma Energy Vanrhynsdorp (Pty) Ltd is proposing to amend the EA from 5 MW PV to 10 MW PV generation capacity and to include the development of a hydrogen plant within the assessed 20 ha on Portion 7 of the Remainder of the Farm De Duinen No. 258 near Vanrhynsdorp.

The proposed property covers an area of 278 ha, of which approximately 20 ha will be developed for the electrolysis hydrogen plant, PV array, consisting of either fixed or single axis tracking systems, and associated infrastructure, allowing for the generation of up to approximately 10 MW of alternating current.

The PV tables will be raised approximately 0.5m off the ground and will not exceed 3m in height at maximum tilt. The electrolysis hydrogen plant and associated structures will cover an area of approximately 0.8 ha within the 20 ha footprint. During the operational phase borehole water will be utilised for the electrolysis to produce hydrogen and oxygen.

Underground electrical power lines transfer generated electricity from blocks of solar panels to inverter/transformer stations within the solar panel area. From these stations, the generated power of the solar block is conveyed through underground electrical power cables to the battery energy storage system and the hydrogen plant.

The hydrogen plant has strict installation and operations protocols and standards to which it must adhere. The hydrogen plant will be installed and operated accordingly. The hydrogen plant will also be monitored at the frequency determined by the protocols / guidelines as a safety procedure and to allow for monitoring of possible leaks.

The proposed electrolysis hydrogen plant requires 5 MW to be operational. The solar facility has a maximum 10 MW peak capacity to ensure that adequate power is available for the hydrogen plant during periods of unfavourable solar conditions. The electricity generated from the maximum 10 MW peak solar facility will be used to power the hydrogen plant to split the purified water into hydrogen and oxygen. The water will be obtained from boreholes on Portion 7 of the Remainder of the Farm De Duinen No. 258 and will be stored in a reservoir as required for the electrolysis process. The proposed capacity of the reservoir is approximately 200 m³. The water use requirement for the Hydrogen Plant was indicated as 40m³/day which related to a total annual volume of 14 600m³/a.

The borehole water will be demineralized/purified prior to going through the electrolysis process (Figure 1) and the purification process is part of the electrolyser machinery that will be procured. The removed minerals will be captured and discarded in an environmentally friendly manner at a licenced facility, along with any other potential waste generated from the development.

The produced hydrogen and oxygen will typically be stored in ISO containers. A portion of the oxygen will be processed, dried and stored (bottled) for re-sale. The remainder of the oxygen will be released into the atmosphere. The hydrogen will be stored under high pressure containers with a capacity of

750 kg at 200 bar. The hydrogen facility will have a total storage capacity for dangerous goods, of approximately 25 cubic meters. The storage duration will depend on the demand, ideally the generated hydrogen and oxygen will be sold and removed from the site on a daily basis. The electrolysis hydrogen plant and its associated structures will cover an area of approximately 0.8 ha within the 20 ha footprint.

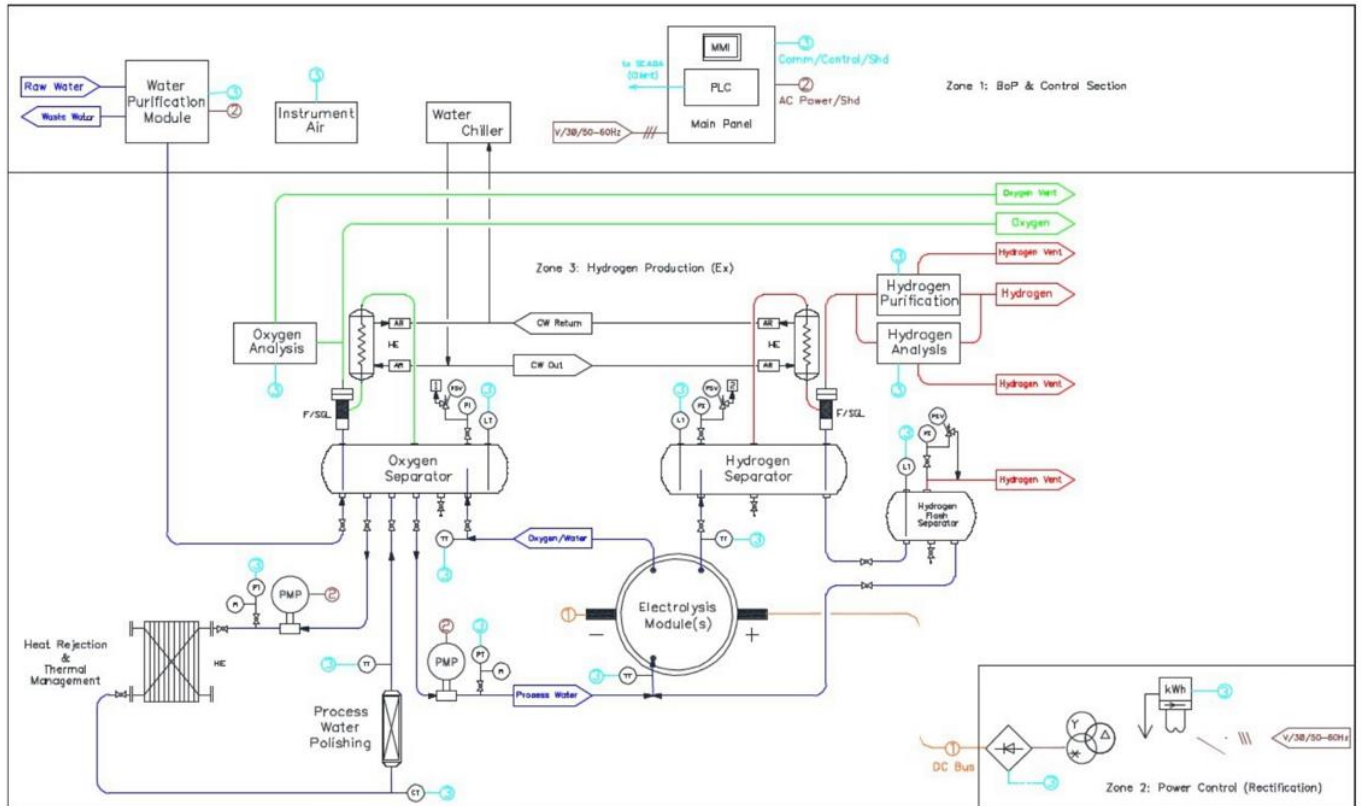


Figure 1: Hydrogen proton exchange membrane electrolysis simplified process flow diagram

Associated infrastructure includes the internal access roads, office buildings with ablutions, maintenance sheds, inverter-transformer stations on concrete pads, hydrogen storage containers, battery storage banks/containers, construction and operational laydown area is also included. The entire site will be fenced off.

Table 1: Dimensions of associated components of the Solar PV facility amendment

Component	Dimensions*
Solar PV array	10 ha, 10MW

Hydrogen plant	0.8 ha
Dangerous Goods storage capacity	25 m ³

*It must be noted that these are the current estimated dimensions with current technology. Changes in technology may impact certain dimensions during the construction phase.

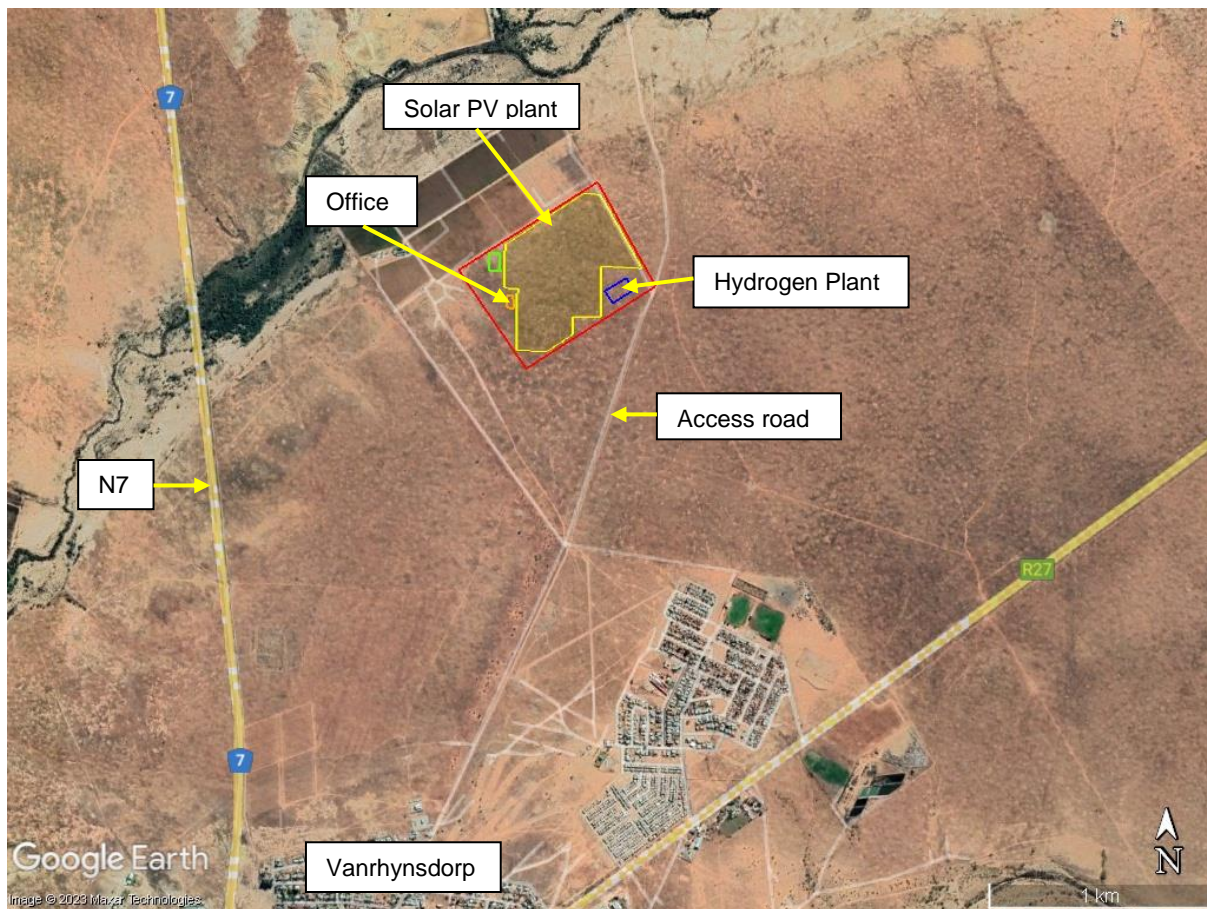


Figure 2: Google Earth image showing the layout of the proposed Vanrhynsdorp Solar PV facility, hydrogen plant and associated infrastructure amendment. The solar PV arrays are indicated by the yellow polygon, the hydrogen plant by the blue polygon and the offices are indicated by the orange polygon. The green polygon represents where the construction site will be.

The site is located approximately 2.87 km North of Vanrhynsdorp and is adjacent to the N7. Access to the site is through gravel roads accessed from the R101 via the N1 or R45 (Figure 2,3 and 4).

Site co-ordinates: Approximate central point: 31°34'46.02"S, 18°44'46.91"E.

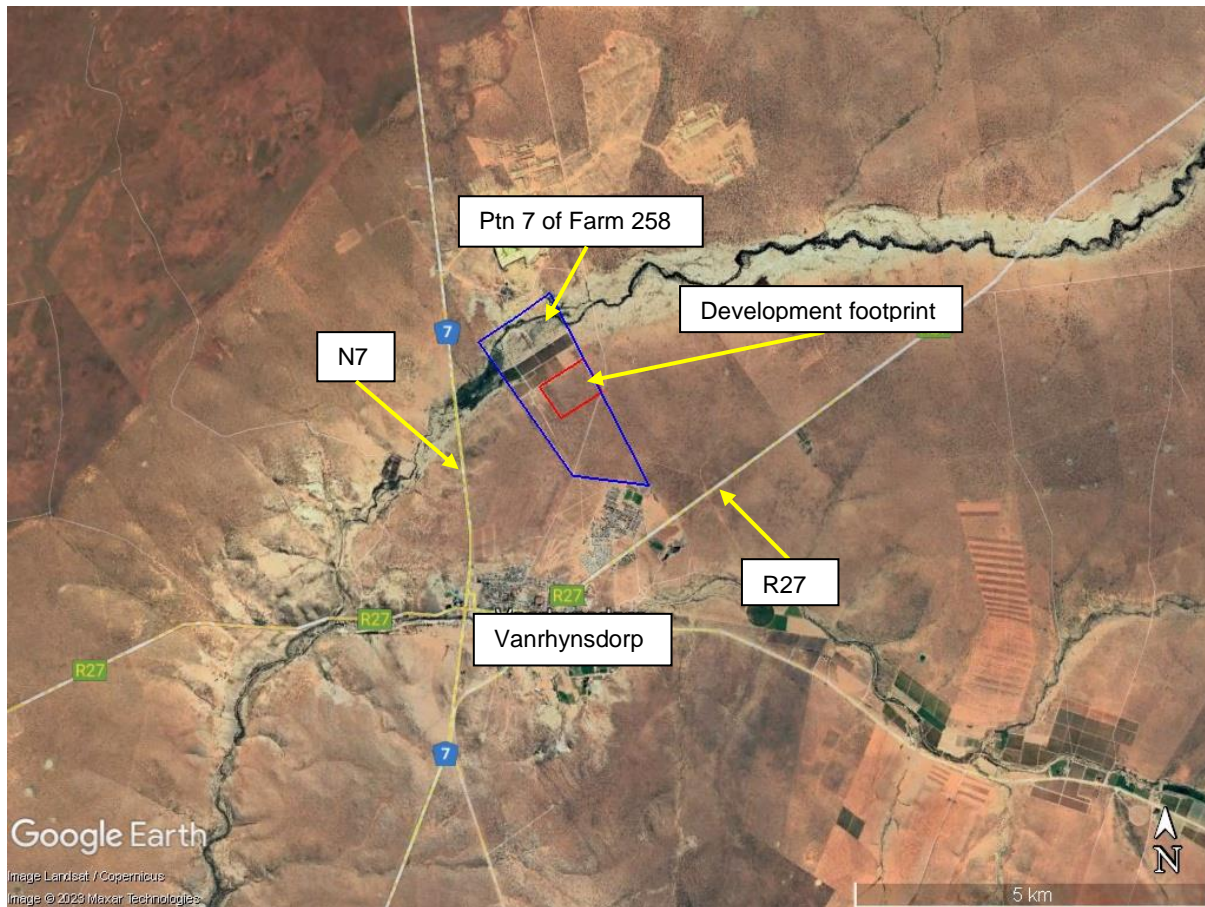


Figure 3: Google Earth image showing the locality of the development site (indicated by the red polygon) on Portion 7 of the Farm De Duinen 258, Vanrhynsdorp (indicated by the red polygon).

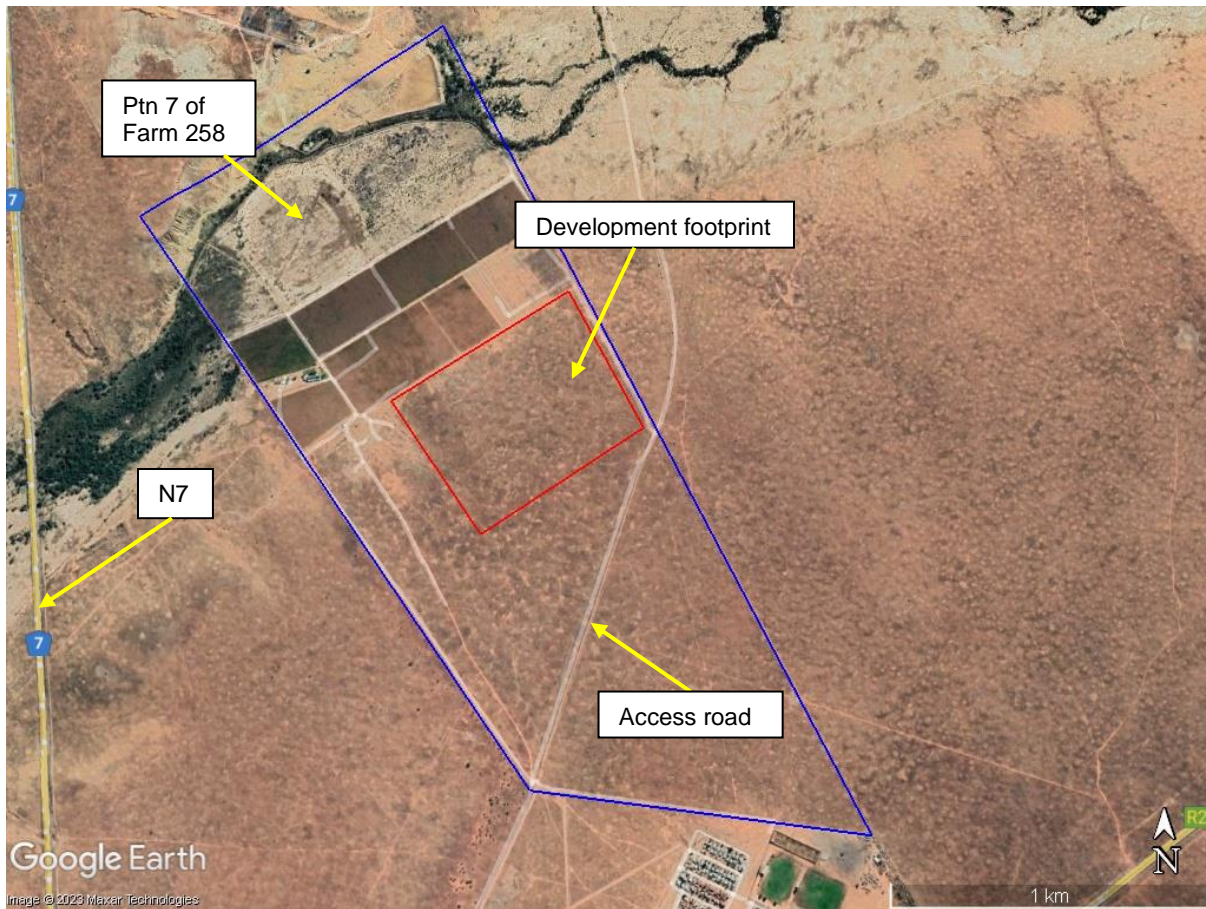


Figure 4: Google Earth image of the development site (indicated by the red polygon) on Portion 7 of the Farm De Duinen 258, Vanrhynsdorp (indicated by the blue polygon).

The amendments that are being applied for is summarised in Table 2.

Table 2: Amendments that are applied for.

The amendment application for the Vanrhynsdorp Solar PV Facility environmental authorisation include the following:

From authorised activity maximum electricity generation from 5 MW, amend to a maximum of 10 MW (p3 and 4 of EA reference 14/12/16/3/3/1/1854);

From only 10 ha of land being used for electricity generation (p4 of EA reference 14/12/16/3/3/1/1854), amend to less than 20 ha of land being used for electricity generation (PV solar panels);

From the development comprising of 18540 array of poly-crystalline solar PV modules grouped into tables or panels of 20 modules, amend to adequate amount of poly-crystalline solar PV modules grouped into various tables or panels, that cover an area less than 20 ha, that can generate a

maximum of 10 MW electricity.

From authorised nameplate capacity of 5.75 MW, change to nameplate capacity of a maximum of 10 MW (p3);

From 3 inverter-transformer stations to 6 inverter-transformer stations (p4);

From authorised evacuation to the national grid, change to evacuation to a hydrogen plant within the 20 ha approved solar plant development area, and/or other possible clients, bidders, municipalities and the national grid;

Amend EA reference 14/12/16/3/3/1/1854 to include the development of a hydrogen plant within the approved 20 ha solar plant area

1.5 INTEGRATED ENVIRONMENTAL MANAGEMENT

The general objectives of Integrated Environmental Management have been taken into account through the following:

- The actual and potential impacts of the activity on the environment, socio-economic conditions and cultural heritage have been identified, predicted and will be evaluated, as well as the risks and consequences and options for mitigation of activities, with a view to minimizing negative impact, maximizing benefits (advantages) and promoting compliance with the principles of environmental management.
- The effects of the proposed amendment on the environment have been considered before actions taken in connection with them.
- Adequate and appropriate opportunity for public participation is ensured through the public participation process.

1.6 PRINCIPLES OF ENVIRONMENTAL MANAGEMENT

The principles of environmental management as set out in section 2 of NEMA have been taken into account. The principles pertinent to this amendment activity include:

- People and their needs have been placed at the forefront while serving their physical, psychological, developmental, cultural and social interests – *the proposed activity will have a beneficial impact on people. However, potential negative impacts will also be investigated.*
- Development must be socially, environmentally and economically sustainable. Where disturbance of ecosystems, loss of biodiversity, pollution and degradation, and landscapes and sites that constitute the nation's cultural heritage cannot be avoided, are minimised and remedied. - *Although the activity is expected to have little significant environmental impact,*

these impacts have been considered, and mitigation measures have been put in place in the EA and EMP that will be implemented.

- Where waste cannot be avoided, it is minimised and remedied through the implementation and adherence of EMP.
- The negative impacts on the environment and on people's environmental rights have been anticipated and will be prevented, and where they cannot be prevented, are minimised and remedied.
- The interests, needs and values of all interested and affected parties will be taken into account in any decisions through the Public Participation Process
- The social, economic and environmental impacts of the activity have been considered, assessed and evaluated, including the disadvantages and benefits
- The effects of decisions on all aspects of the environment and all people in the environment have been taken into account, by pursuing what is considered the best practicable environmental option – *the proposed activity is expected to have minimal/negligible environmental impacts, especially after mitigation measures as described in the specialist reports.*

2. LEGAL REQUIREMENTS

The current assessment is being undertaken in terms of the National Environmental Management Act (Act 107 of 1998, NEMA), to be read with section 31: NEMA EIA Regulations 2014. However, the provisions of various other Acts must also be considered within this EIA.

2.1 THE CONSTITUTION OF THE REPUBLIC OF SOUTH AFRICA

The Constitution of the Republic of South Africa (Act 108 of 1996) states that everyone has a right to a non-threatening environment and that reasonable measure are applied to protect the environment. This includes preventing pollution and promoting conservation and environmentally sustainable development, while promoting justifiable social and economic development.

As stated in the Socio-economic Impact Assessment (**Appendix 4E**), the proposed solar facility is in line with the Constitution (1996) and the Bill of Rights as it promotes the use of renewable resources to generate energy. These resources i.e. sun and wind, are not harmful to the health or well-being of the population and protect the environment for the benefit of present and future generations.

2.2 NATIONAL ENVIRONMENTAL MANAGEMENT ACT (ACT 107 OF 1998)

The National Environmental Management Act (Act 107 of 1998) (NEMA), as amended, makes provision for the identification and assessment of activities that are potentially detrimental to the environment, and which require authorisation from the relevant authorities based on the findings of an environmental assessment. NEMA is a national act, which is enforced by the Department of Forestry, Fisheries and the Environment (DFFE). These powers are delegated in the Western Cape to the Department of Environmental Affairs and Development Planning (DEADP). In terms of Section 24C of NEMA, the national Department of Forestry, Fisheries and the Environment (DFFE) is the Competent Authority.

On the 04 December 2014 the Minister of Water and Environmental Affairs promulgated regulations in terms of Chapter 5 of the NEMA, namely the EIA Regulations 2014. These were amended on 07 April 2017 (GN No. 326, No. 327 (Listing Notice 1), No. 325 (Listing Notice 2), No. 324 (Listing Notice 3) in Government Gazette No. 40772 of 07 April 2017). Listing Notice 1 and 3 are for a Basic Assessment and Listing Notice 2 for a full Environmental Impact Assessment.

According to the regulations of Section 24(5) of NEMA, authorisation is required for the following listed activities and was obtained for the solar PV development (DFFE Reference 14/12/16/3/3/1/1854/AM1):

Government Notice R327 (Listing Notice 1) listed activities:

1 The development of facilities or infrastructure for the generation of electricity from a renewable resource where-

- (i) *the electricity output is more than 10 megawatts but less than 20 megawatts; or*
- (ii) ***the output is 10 megawatts or less but the total extent of the facility covers an area in excess of 1 hectare;***

Excluding where such development of facilities or infrastructure is for photovoltaic installations and occurs:

- (a) *within an urban area; or,*
- (b) *on existing infrastructure.*

The authorised solar photovoltaic array with an electricity output of 5 MW and a footprint greater than 1 ha but not exceeding 20 ha will be amended to an electricity output of 10 MW and to include a hydrogen plant. The development will supply electricity to the hydrogen plant and where else required. The site is located outside an urban area or industrial complex. No exclusions apply.

27 The clearance of an area of 1 hectares or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for:-

- (i) *the undertaking of a linear activity; or;*
- (ii) *maintenance purposes undertaken in accordance with a maintenance management plan.*

The clearance of vegetation within the assessed 20 ha demarcated footprint has been authorised for the solar PV plant, including associated infrastructure. The amendment will be to include the hydrogen plant and associated infrastructure within the assessed 20 ha footprint. The vegetation that will be cleared will be greater than 1 ha but will not exceed 20 ha. No exclusions apply.

2.3 NATIONAL HERITAGE RESOURCES ACT

The protection and management of South Africa's heritage resources are controlled by the National Heritage Resources Act (Act No. 25 of 1999). South African National Heritage Resources Agency (SAHRA) is the enforcing authority.

In terms of Section 38 of the National Heritage Resources Act, SAHRA will require a Heritage Impact Assessment (HIA) where certain categories of development are proposed. Section 38(8) also makes provision for the assessment of heritage impacts as part of an EIA process and indicates that if such an assessment is found to be adequate, a separate HIA is not required.

Furthermore, in terms of Section 34(1), no person may alter or demolish any structure or part of a structure, which is older than 60 years without a permit issued by the SAHRA, or the responsible resources authority. Nor may anyone destroy, damage, alter, exhume or remove from its original position, or otherwise disturb, any grave or burial ground older than 60 years, which is situated outside a formal cemetery administered by a local authority, without a permit issued by the SAHRA, or a provincial heritage authority, in terms of Section 36 (3). In terms of Section 35 (4), no person may destroy, damage, excavate, alter or remove from its original position, or collect, any archaeological material or object, without a permit issued by the SAHRA, or the responsible resources authority.

Section 38(1) of the NHRA of 1999 requires the responsible heritage resources authority to notify the person who intends to undertake a development that fulfils the following criteria to submit an impact assessment report if there is reason to believe that heritage resources will be affected by such event:

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- the construction of a bridge or similar structure exceeding 50m in length;
- any development or other activity that will change the character of a site
 - exceeding 5000m² in extent; or
 - involving three or more existing erven or subdivisions thereof; or
 - involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- the rezoning of a site exceeding 10 000m² in extent; or
- any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.

2.4 EIA GUIDELINE AND INFORMATION DOCUMENT SERIES

The following are the latest guidelines and information Documents that have been consulted:

- Department of Environmental Affairs and Development Planning's (DEADP) *Environmental Impact Assessment Guideline and Information Document Series (Dated: March 2013)*:
 - ✓ *Guideline on Transitional Arrangements*
 - ✓ *Generic Terms of Reference for EAPs and Project Schedules*
 - ✓ *Guideline on Public Participation*
 - ✓ *Guideline on Exemption Applications*
 - ✓ *Guideline on Appeals*
 - ✓ *Guideline on Need and Desirability*

2.5 NATIONAL WATER ACT

Besides the provisions of NEMA for this EIA process, the proposed development may also require authorizations under the National Water Act (Act NO. 36 of 1998). The Department of Water Affairs, who administer that Act, will be a leading role-player in the EIA.

The Water Use Licence Application (WULA) is in process. This application will run concurrently with the NEMA Application.

2.6 NATIONAL ENVIRONMENTAL MANAGEMENT: BIODIVERSITY ACT

The National Environmental Management: Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) is part of a suite of legislation falling under NEMA, which includes the Protected Areas Act, the Air Quality Act, the Integrated Coastal Management Act and the Waste Act. Chapter 4 of NEMBA deals with threatened and protected ecosystems and species and related threatened processes and restricted activities.

2.7 THE SPATIAL PLANNING AND LAND USE MANAGEMENT ACT (ACT 16 OF 2013)

The subject area falls under the jurisdiction of the local municipality and the appropriate zoning and subdivision has been allocated, in order to permit the development of the land for the intended purpose.

2.8 THE CONSERVATION OF AGRICULTURAL RESOURCES ACT (ACT 43 OF 1983)

According to the Department of Environmental Affairs (2015). EIA Guideline for Renewable Energy Projects. Department of Environmental Affairs, Pretoria, South Africa, the mandate of the Conservation and Agricultural Resources Act 1983 (Act No 43 of 1983) (CARA) is to conserve “natural agricultural resources” (the soil, the water sources and the vegetation, excluding weeds and invader plants) through production potential of land, by the combating and prevention of erosion and weakening or destruction of the water sources, and by the protection of the vegetation and the combating of weeds and invader plants.

A Soil, Land-use and Agricultural Potential Assessment has been conducted for the EA and the content thereof was confirmed to be still applicable for the proposed amendment.

2.9 NATIONAL ENERGY ACT (ACT 34 OF 2008)

The National Energy Act (Act 34 of 2008) promotes diversification of energy sources and supply including renewable resources, i.e. solar and wind. The diversified energy resources have to be available in sustainable quantities at affordable prices and should support economic growth, poverty alleviation and consider the preservation of the environment.

As the proposed Solar Facility enhances energy source diversification, it is thus in line with the National Energy Act.

2.10 NATIONAL CLIMATE CHANGE RESPONSE WHITE PAPER (2011)

The Climate Change Response White Paper was largely informed by a process known as the Long-Term Mitigation Scenario (LTMS) formulation. The Response addressed South Africa's dependency on its energy intensive industry reliant on coal, poverty and inequality and moving to a low carbon development path (Emissions peak in 2020-2025, remain for a decade and decline in absolute terms from 2030 -2035 onwards).

The approved Roma Energy Vanrhynsdorp Solar development and proposed amendment enhances moving to a low carbon development path, it is thus in line with the National Climate Change Response White Paper.

2.11 WHITE PAPER ON RENEWABLE ENERGY (2003)

As signatory to the Kyoto Protocol, Government is determined to, by means of the White Paper on Renewable Energy (November, 2003):

- a) Make good the country's commitment to reduce greenhouse gas emissions and
- b) Ensure energy security through diversification of supply (National Energy Act).

Government's long-term goal is to establish a renewable energy industry that will offer in future sustainable, fully non-subsidized alternatives to fossil fuels. The medium-term (10-year) target set in the White Paper is *10 000 GWh renewable energy contribution to final energy consumption by 2013, to be produced mainly from biomass, wind, solar and small-scale hydro electrical plants*. The proposed amendment of the Solar Facility supports government's medium and long term renewable energy goals as it will assist to reduce the country's greenhouse gas emissions and promote energy security.

3. SITE AND REGION DESCRIPTION

3.1 LOCATION

The site is located approximately 2.87 km North of Vanrhynsdorp and is adjacent to the N7. Access to the site is through gravel roads accessed from the R101 via the N1 or R45 (Figure 5).

Table 3: The site coordinates of the site are as follows (refer to map below):

Coordinates of corner points of the assessed development footprint	Point	Latitude (S) (DDMMSS)			Longitude (E) (DDMMSS)		
	A	31°	34'	46.927"	18°	44'	25.331"
	B	31°	34'	33.040"	18°	44'	48.801"
	C	31°	34'	49.198"	18°	44'	59.100"
	D	31°	35'	0.133"	18°	44'	35.744"

Table 4: The site Component central coordinates for the development are as follows (refer to the overlay map):

Component central coordinates	Latitude (S) (DDMMSS)			Longitude (E) (DDMMSS)		
PV array	31°	34'	47.297"	18°	44'	43.283"
Hydrogen Plant	31°	34'	50.458"	18°	44'	53.388"
Office	31°	34'	51.883"	18°	44'	34.854"
Water reservoir	31°	35'	50.352"	18°	44'	34.792"

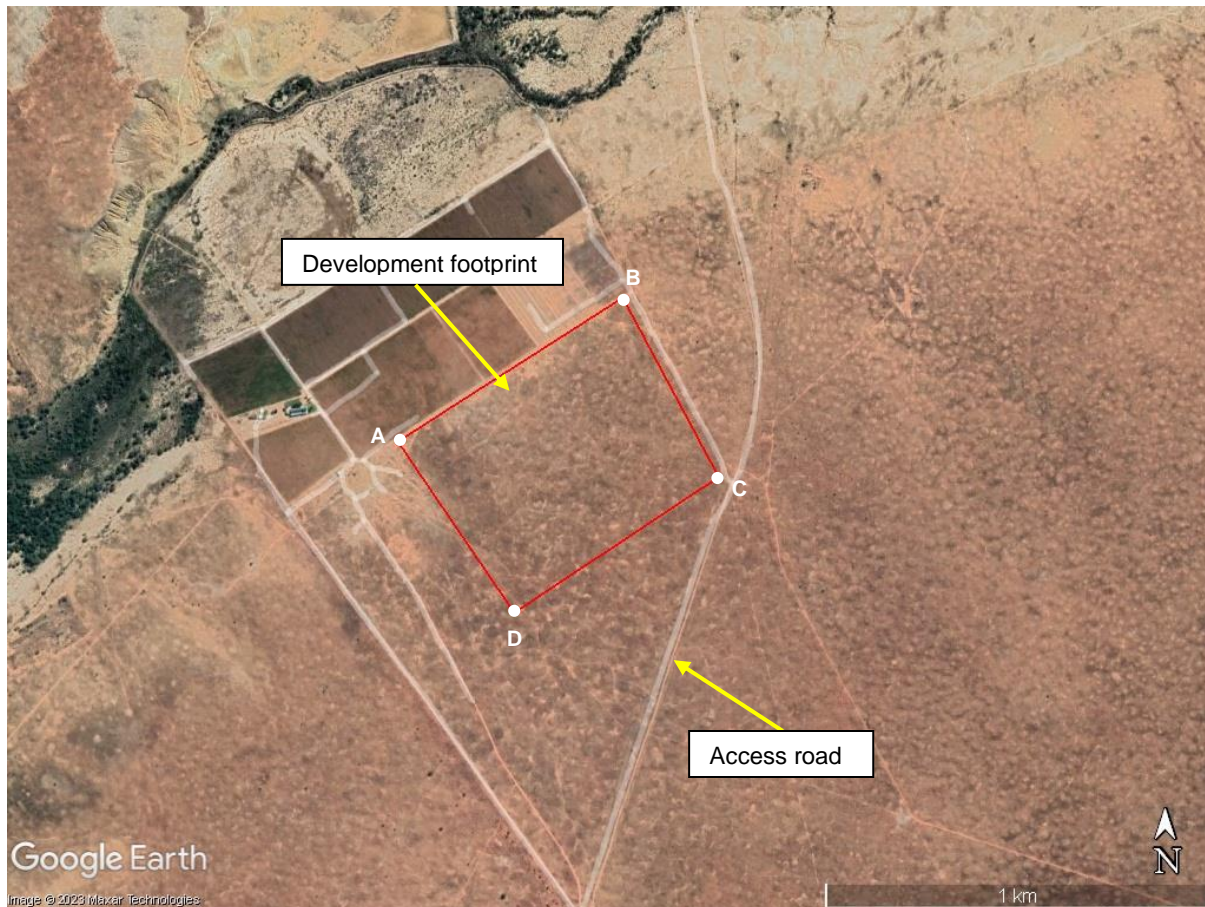


Figure 5: Google Earth image of the development footprint (indicated by the red polygon).

3.2 TERRESTRIAL BIODIVERSITY

According to the Vegetation map of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006, as updated in the 2012 beta version and 2018 Final) the vegetation type expected on the proposed site is Vanrhynsdorp Gannabosveld (Least Concern)(See Figure 6). During 2022 the “Revised List of ecosystems that are threatened and in need of protection” (GN 47526 of 18 November 2022), was promulgated in terms of the National Environmental Management Biodiversity Act, Act 10 of 2004. Vanrhynsdorp Gannabosveld vegetation remains classified as “Least Threatened” in terms of this updated classification.

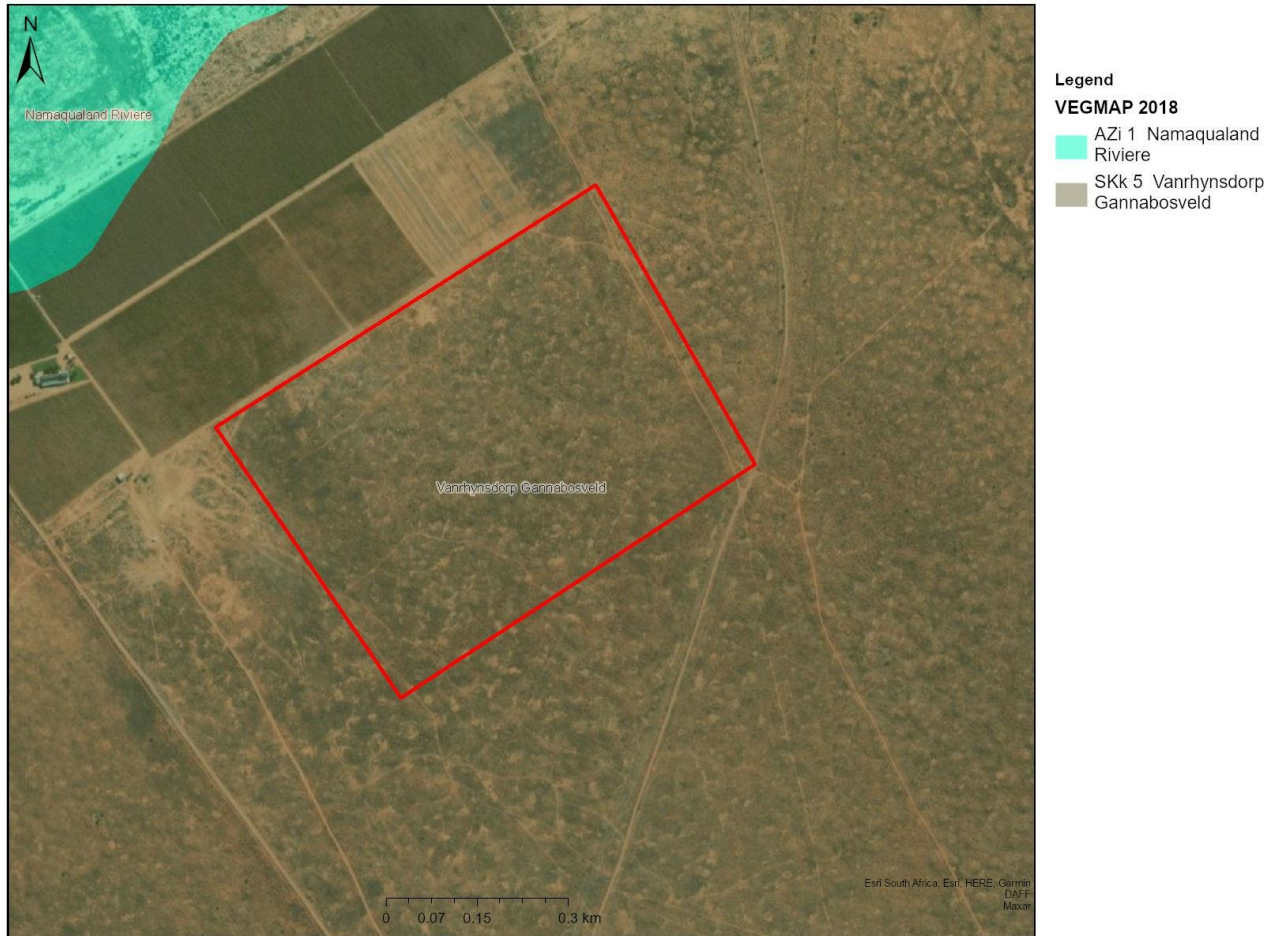


Figure 6: SANBI (2006 - 2018) Vegetation Map of South Africa, Lesotho and Swaziland, Mucina for the area and the development footprint (indicated by the red polygon)

Large parts of Portion 7 of the Farm De Duinen No. 258 have been disturbed by past agricultural activities, primarily through livestock grazing. The ongoing drought left its mark on the veld, and many plants within the study area and surroundings showed signs of being severely affected by the dry spell. The vegetation was described as a low open shrubland (< 0.5 m high), supporting a disturbed version of Gannabosveld, dominated by *Salsola zeyheri* (Gannabos), and hardy *Mesembryanthemum* species. The plant species encountered was reported to be lower than expected (Appendix 4A), which is probably a combination of the ongoing drought (leaf succulents being very susceptible to extended dry spells) together with historic and present grazing practices.



Figure 7: Typical low open shrubland encountered on site, dominated by *Salsola zeyheri* and lower grasses (grazed). Note the *Prosopis* trees in the far background

Species like *Galenia africana*, many of the Aizoaceae and *Atriplex cf. lindleyi* are normally pioneers species and often disturbance indicators. *Bromus pectinatus* and *Stipa capensis* was observed on the site which signifies that the veld has been subjected to grazing (over grazing) over a long period of time by domestic stock (which is more specialized in their grazing habits and tends to have a more severe impact on the veld).



Figure 8: Photo from the middle of the site facing southeast to northwest with an agricultural area in the background.



Figure 9: Photo from the middle of the site facing northwest to southeast with existing power lines running along the entrance road to the site.

According to biodiversity overlay maps from SANBI BGIS (Figure 10) the site falls within an Ecological Support Areas (ESA1).

The DFFE Screening Tool Report (Appendix 5) identified the site as having a Very High Terrestrial Biodiversity Sensitivity.

No rivers, watercourses or even drainage lines were observed on the proposed solar location. The nearest watercourses is the Droë River located approximately two kilometres to the north-west of the proposed location, while the Klein River is found approximately 1.8 km to the south of the proposed location.

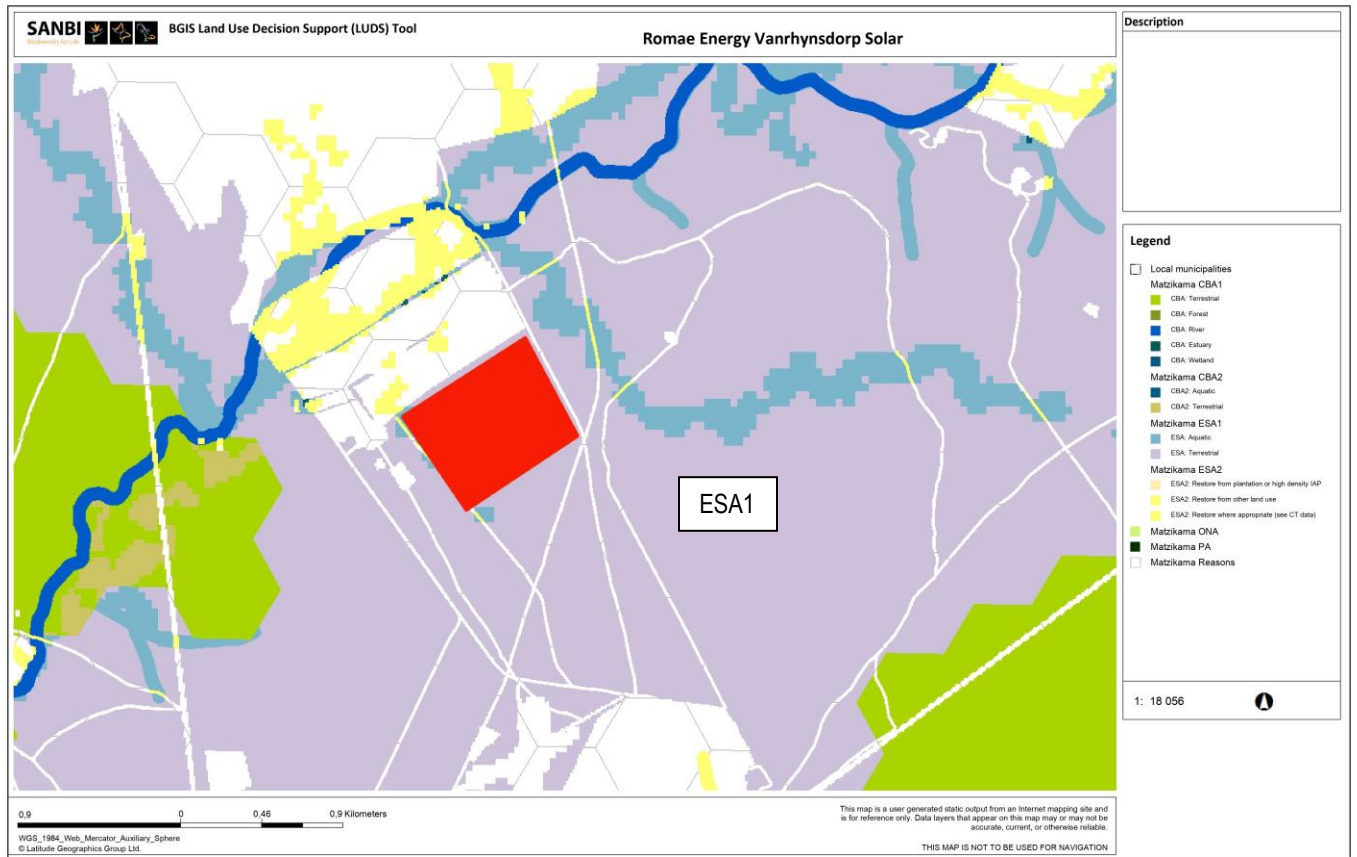


Figure 10: The Western Cape Biodiversity Spatial Plan 2017 map, indicating that the site (red polygon) is in an area classified as an ESA1.

3.3 TOPOGRAPHY

The landscape is mainly flat. The footprint of the proposed solar site is almost flat, but with a slight slope towards the Droë River (Figure 11). Elevation varies from 138 m at the south-east corner (the higher point) to approximately 128 m at the north-western corner of the site (lowest point) with an average slope of 1.5% and an elevation loss of about 10 m.

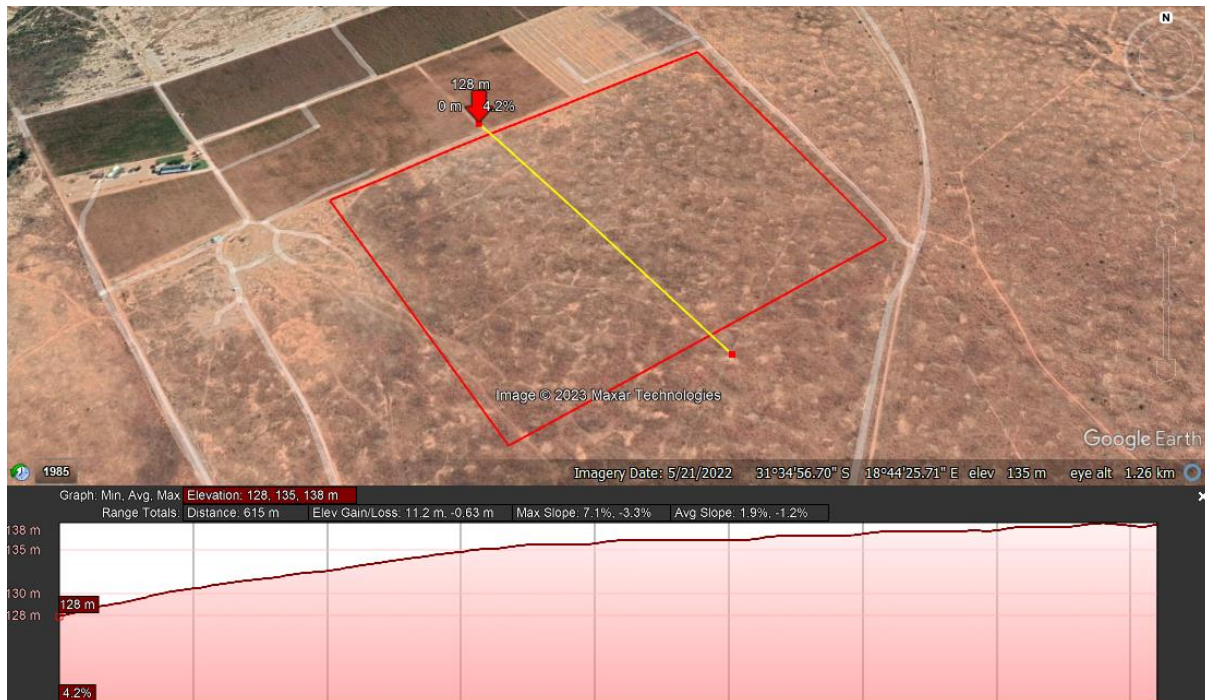


Figure 11: Google image, showing the topography of the site as it site slopes from east to west (towards the Droë River)

3.4 AGRICULTURE, SOIL AND GEOLOGICAL STABILITY OF THE SITE

3.4.1 GEOLOGY AND SOIL

The site falls into the Ag202 land type (Land Type Survey Staff, 1972-2006). Ag land type denotes areas that are dominated by shallow structureless soils with regular occurrence of lime in the soil profiles. The soils are of high base status or lime containing hardpan lime at depth. Heuweltjies occur through the area. Land capability and land use: Mainly extensive grazing due to climatic and soil constraints. Crop production is only possible with very intensive preparation, in the form of ripping and land form shaping, and if water is supplied through irrigation. The preparation and establishment costs are such that it is only considered if a long term plan, with adequate market research and funding, has been drawn up.

The origin of the soils in this area is mainly aeolian and the soils are red due to the relative age of the aeolian deposits. These areas are often associated with "heuweltjies" (Figures 5 to 7) that are thought to be the products of long-term vegetation collection by termites (*Microhodotermes*). The specific mechanism of formation is not clear and, although presently associated with the termites, it is also not clear which the formation agent was (Fey, 2010). The heuweltjies are characterised by distinct accumulations of calcium carbonate (lime - Figures 8 and 9), silica, sepiolite and manganese oxides

(Ellis, 2002; Francis, 2007). All these minerals are indicative of arid soil conditions. Due to the distinct spatial variation in lime distribution on such sites the soils vary significantly and the site is therefore classified rather as one with "heuweltjie" soils. The soils on the heuweltjies are predominantly of the Couga (Orthic A-horizon / Hardpan Carbonate Horizon), Brandvlei (Orthic A-horizon / Soft Carbonate B- horizon) and Prieska (Orthic A-horizon/Neocarbonate B-horizon / Hardpan Carbonate Horizon) forms.

3.4.2 AGRICULTURAL POTENTIAL

The Agricultural potential of the site is very low in the natural state due to soil and climate constraints with the potential of improvement in the case of land preparation, provision of water through irrigation and intensive management of water, salts, pests and markets.

It is concluded that the proposed development of a photovoltaic facility with a hydrogen plant on the site will not have large impacts due to the low agricultural potential of the site. The low agricultural potential of the site is the result of the dominance of shallow soils with root development restrictions as well as the very low rainfall of the area.

3.5 CLIMATE

The Succulent Karoo Biome is primarily determined by the presence of low winter rainfall and extreme summer aridity. Rainfall varies between 20 and 290 mm per year. The rains are cyclonic and not in the form of thunderstorms, which means that its erosive power is far less than what is experienced in the summer rainfall biomes and the rain itself is more penetrative. During summer, temperatures higher than 40°C are common. Fog occurs regularly in the regions closer to the coast. Frost is infrequent. Desiccating, hot, katabatic winds may occur throughout the year. A prominent climate conditions that affects the area, is the rainfall.

All regions with a rainfall of less than 400 mm per year are regarded as arid. Vanrhynsdorp normally receives about 133 mm of rain per year and because it receives most of its rainfall during winter it has a Mediterranean climate. This region receives the lowest rainfall (0 mm) in January and February and the highest (29 mm) in June. The monthly distribution of average daily maximum temperatures (centre chart below) shows that the average midday temperatures for Vanrhynsdorp range from 19.3°C in July to 32.3°C in February. The region is the coldest during July when the temperature drops to 5.9°C on average during the night.

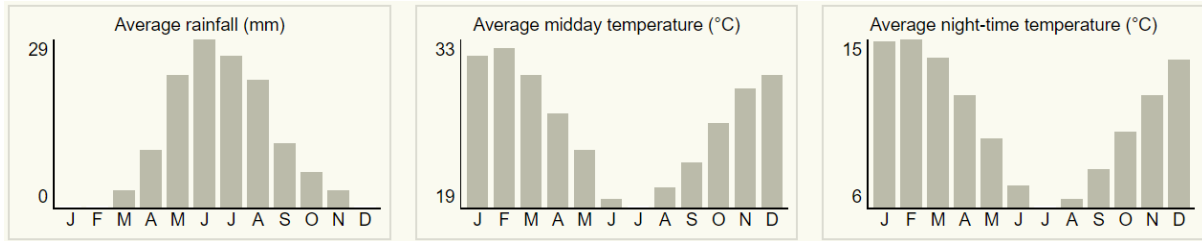


Figure12: A summary of climate data (Source: https://www.saexplorer.co.za/south-africa/climate/vanrhynsdorp_climate.html)

3.6 SOCIO-ECONOMIC CONTEXT

In 2021, the Matzikama Local Municipality had a total population of 72 759 and this included 21 172 households with an average household size of 3.8 people per household. (Source: Matzikama SEP, 2021).

According to the Matzikama Local Municipality Final Integrated Development Plan (2017-2022), for two consecutive periods 1996 – 2001 and 2001 - 2011, the Matzikama Local Municipality experience a negative growth of 2.88% and 0.04% respectively.

According to StatSA, the unemployment rate for Matzikama was 13.3% in 2020 and estimated to have increased to 16.4% in 2021.

According to the Matzikama Local Municipality Final Integrated Development Plan (2017-2022), Matzikama Local Municipality will develop the Energy Resource Plan to guide and address energy needs and that will be aligned with the national plan. The Municipality is trying level best to decrease its carbon footprint thus moving towards green economy.

The Matzikama Local Municipality approximately contributed R4 470 million to the economy and gross domestic product (GDP) of the West Coast District. In 2020, the Agriculture Sector remained the largest contributor to the Matzikama Local Municipality's GDP with a figure of 25.1%. The Trade Sector's contribution, despite its contraction, remained the second largest contributor with a figure of 13.9%.

3.7 HERITAGE FEATURES

An Archaeological Impact Assessment (AIA) for the construction of the proposed Roma Energy Solar Energy Farm on Farm De Duinen No. 258 in Vanrhynsdorp was undertaken in 2012 and 2017.

The AIA formed part of a wider Heritage Impact Assessment (HIA) for the proposed development which included a Visual Impact Assessment (VIA) and Palaeontological Impact Assessment (PIA).

The reports were submitted as part of a Basic Environmental Assessment process undertaken by independent environmental consultants EnviroAfrica cc.

On the proposed development site 114 archaeological occurrences were documented. The majority of the remains were assigned to the Middle Stone Age (MSA), but Later Stone Age (LSA) tools were also encountered, including two Early Stone Age flakes. More than 80% of the implements are in quartzite and silcrete, but a few lithics in indurated shale, quartz, chalcedony and ironstone were also noted. Most of the tools comprised single, dispersed and isolated occurrences on calcareous red sands, but implements were also clustered on patches of quartz gravels on higher elevations overlooking the floodplain of the Droerivier. No graves or grave markers were found.

For the proposed amendment a Notice of Intent to Develop (NID) was compiled by Agency for Cultural Resource Management (ACRM). Heritage Western Cape (HWC), the delegated Provincial Heritage Authority, reviewed the HIA and issued a Final Comment, indicating that they have 'no objections to the proposed development.

4. SPECIALIST STUDIES

The following specialist inputs form part of the report.

DISCIPLINE	SPECIALIST	ORGANISATION
Terrestrial Biodiversity	Peet Botes	PB Consult
Heritage	Jonathan Kaplan	Agency for Cultural Resource Management
Agriculture and Soil	Dr Johan van der Waals	Terra Soil Science
Visual	Sarien Lategan	
Socio-economic	Anelia Coetzee	Leap Sustainable Development

5. PUBLIC PARTICIPATION

A Public Participation Process was undertaken in accordance with the requirements of the NEMA Environmental Impact Assessment Regulations: Guideline and Information Document Series. *Guidelines on Public Participation 2013* and the NEMA EIA Regulations 2014 (amended). Issues and

concerns raised during the Pre-application public participation phase for the draft impact report are dealt within this final impact report.

5.1 PUBLIC PARTICIPATION UNDERTAKEN DURING PRE-APPLICATION PHASE:

Interested and Affected Parties (I&APs) were identified throughout the process. Landowners adjacent to the proposed site, relevant organs of state, organizations, ward councillors and the Local and District Municipality were added to this database. A complete list of organisations and individual groups identified to date is shown in **Appendix 2A**.

Public Participation was conducted for the proposed development in accordance with the requirements outlined in Regulation 41 of the NEMA EIA Regulations 2014. The issues and concerns raised during the Pre-application phase was dealt with in the application phase.

As such each subsection of Regulation 41 contained in Chapter 6 of the NEMA EIA Regulations 2014 was addressed separately to thereby demonstrate that all potential Interested and Affected Parties (I&AP's) were notified of the proposed development.

R41 (2) (a):

R41 (2) (a) (i): Site notices (A2) were placed at the property's entrance gate and the fence corner of the gold course next to the path. A3 posters were placed at other locations including:

- At the site
- Public Notice board at the Vanrhynsdorp Agrimark
- Public Notice board at the pay office of the Matzikama Local Municipality in Vanrhynsdorp
- Public Notice board at the Post Office in Vanrhynsdorp (A4)

The posters contained all details as prescribed by R41(3) (a) & (b) and the size of the on-site poster was at least 60cm by 42cm as prescribed by section R41 (4) (a).

R41 (2) (a) (ii): N/A. There is no alternative site.

R41 (2) b):

R41 (2) (b) (i): N/A. Notification letters was provided to the landowner.

R41 (2) (b) (ii): Notification letters was circulated to neighbouring landowners. **Appendix 2C**.

R41 (2) (b) (iii): Notification letters were sent to the municipal Ward councillors at the Matzikama Local Municipality, for the ward in which the site is situated (please refer to **Appendix 2C** for proof of notification letters sent).

R41 (2) (b) (iv): A notification letter was sent to the Matzikama Local Municipality.

R41 (2) (b) (v): Notification letters (please refer to **Appendix 2C** for proof of notification letters sent) were sent to the following organs of state having jurisdiction in respect of any aspect of the activity:

- Eskom
- Department of Environmental Affairs and Development Planning
- Department of Water and Sanitation
- Department of Agriculture, Forestry, Fisheries
- Department of Agriculture, Forestry, Fisheries and the Environment Public Information Management
- SANRAL
- CapeNature

R41 (2) (c) (i): An advertisement was placed in the local newspaper, Ons Kontrei, on 5 August 2022 (please refer to **Appendix 2B** for proof of advertisement).

R41 (2) (d): N/A

R41 (6):

R41 (6) (a): All relevant facts in respect of the application were made available to potential I&AP's.

R41 (6) (b): I&AP's were given more than a 30-day registration and comment period on the proposed application during public participation processes.

R42 (a), (b), (c) and R43(2): A register of interested and affected parties was opened, maintained and is available to any person requesting access to the register in writing (please refer to **Appendix 2A** for the list of Interested and Affected Parties).

Please find attached in **Appendix 2:**

- Proof of Notice boards, advertisements and notices that were sent out (**Appendix 2D**)
- List of potential interested and affected parties

- Summary of issues raised by interested and affected parties (**Appendix 2E**)

5.2 PUBLIC PARTICIPATION UNDERAKEN DURING THE EIA PHASE:

A number of groups and individuals were identified as Interested and Affected Parties during the Public Participation Process. A complete list of organisations and individual groups identified to date, as well as those I&APs that have registered are shown in **Appendix 2A**.

Full copies of the Environmental Impact Assessment Report (EIR) will be sent to all Registered I&APs, and will be notified of the Environmental Impact Report (EIR) by means of notification letters (via preferred method of communication), informing them of the availability of the Draft EIR and will be invited to comment. The EIR will be made available for a 30-day comment period. The comment period will also include a public participation period.

At the end of the comment period, the EIR will be revised in response to feedback received from I&APs. All comments received and responses to the comments will be incorporated into the Final Environmental Impact Report (Final EIR) in the form of a Comments and Response Table. The Final EIR will be made available for a further 30-day comment period. The Final EIR will then be submitted to DFFE for decision.

Should it be required, this process may be adapted depending on input received during the ongoing process and as a result of public input. Both DFFE and registered I&APs will be informed of any changes in the process.

5.3 INTERESTED AND AFFECTED PARTIES

Interested and Affected Parties (I&APs) have been notified by means of advertisements in regional and local newspapers, site notices and letters and/or emails to registered I&APs on the project database.

A list of I&APs is included as **Appendix 2A**.

6. ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS

Environmental issues were raised through informal discussions with the project team, specialists and authorities, as well as by Interested and Affected Parties during the public participation period of the Scoping Report. All issues raised will be assessed in the specialist reports and will form part of the Environmental Impact Report. Any additional issues raised during the public participation will be listed in the Final Environmental Impact Report.

The following potential issues have been identified:

6.1 TERRESTRIAL BIODIVERSITY

A terrestrial compliance study has been conducted to determine if the proposed change in scope will result in an increased level or change in the nature of impact associated with the proposed amendment. Majority of the site has lower agricultural potential and areas of the site have natural vegetation cover, that has been used primarily for grazing.

The terrestrial compliance study will describe and assess the botanical, avifauna and fauna sensitivity of the area. The terms of reference for this study required a baseline analysis of the flora of the property, including the broad ecological characteristics of the site.

The terrestrial compliance study will include the following:

- The significance of the potential impact of the proposed amendment and related activities – with and without mitigation – on biodiversity pattern and process at the site, landscape and regional scales.
- Recommended actions that should be taken to prevent or, if prevention is not feasible, to mitigate impacts.

6.2 HERITAGE

The possible impact on heritage resources (archaeological and palaeontological) has been identified as a possible environmental impact as a result of the amendment development of the solar PV facility to include a hydrogen plant.

In terms of Section 38(8) of the National Heritage Resources Act, a Notification of Intent to Develop (NID) will be submitted to Heritage Western Cape (HWC).

Section 38(1) of the NHRA of 1999 requires the responsible heritage resources authority to notify the person who intends to undertake a development that fulfils the following criteria to submit an impact assessment report if there is reason to believe that heritage resources will be affected by such event:

- the construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300m in length;
- the construction of a bridge or similar structure exceeding 50m in length;
- any development or other activity that will change the character of a site
 - exceeding 5000m² in extent; or
 - involving three or more existing erven or subdivisions thereof; or
 - involving three or more erven or divisions thereof which have been consolidated within the past five years; or
 - the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- the rezoning of a site exceeding 10 000m² in extent; or
- any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.

A NID has been completed and submitted, that the competent authority could confirm if any additional studies .

6.3 AGRICULTURAL AND SOIL POTENTIAL

Large parts of the property are used for agricultural purposes (grazing). Due to the small size and nature of the proposed amendment and development, a small amount of low potential agricultural land will be lost.

The DFFE Screening Report has also rated the agricultural sensitivity as medium.

An Agricultural potential assessment and soil survey has been conducted and the specialist has confirmed that the initial study is still applicable for the proposed amendment.

6.4 VISUAL

The objective of the Visual Impact Assessment (VIA) is to determine the significance of any visual impact which may result from the proposed amendment. This assessment will indicate whether from a visual perspective the proposed amendment constitutes an acceptable level of change and if so, what potential mitigation measures can reduce such impacts.

The potential exists that the construction of the 10 MW PV facility and hydrogen plant may have a visual impact. To assist authorities thus to making an informed decision, the input of a specialist is required to assist in the project design and assess the visual impact of the preferred project proposal.

The term visual and aesthetic is defined to cover the broad range of visual, scenic, cultural, and spiritual aspects of the landscape. The terms of reference for the specialist are to:

- Provide the visual context of the site regarding the broader landscape context and site-specific characteristics.
- Provide input in compiling layout/design alternatives.
- To describe the affected environment and set the visual baseline for assessment
- Identify the legal, policy and planning context
- Identifying visual receptors
- Predicting and assessing impacts
- Recommending management and monitoring actions

6.5 SOCIO-ECONOMIC

The potential socio-economic impact of a development of this nature and scale will; need to be considered and assessed only on a local scale.

The proposed development has significant potential positive social and economic impacts, from job creation during the construction and operational phases, to reducing the country's electricity demand and promoting alternative renewable energy sources.

However, the proposed amendment could potential have negative social and economic impacts. The socio-economic cost of the amendment will need to be determined through a socio-economic impact assessment.

7. SPECIALIST STUDIES

Based on inputs from the raised by the I&APs and the project team, specialist studies were undertaken to provide information to address the concerns and assess the impacts of the proposed development alternatives on the environment.

The specialists are provided with set criteria for undertaking their assessments, to allow for comparative assessment of all issues. These criteria are detailed in the Terms of Reference to each specialist and summarised below.

7.1 CRITERIA FOR SPECIALIST ASSESSMENT OF IMPACTS

These criteria are based on the EIA Regulations, published by the Department of Environmental Affairs and Tourism (April 1998) in terms of the Environmental Conservation Act No. 73 of 1989.

These criteria include:

- **Nature of the impact**

This is an appraisal of the type of effect the construction, operation and maintenance of the amendment development would have on the affected environment. This description should include what is to be affected and how.

- **Extent of the impact**

Describe whether the impact will be: local extending only as far as the development site area; or limited to the site and its immediate surroundings; or will have an impact on the region, or will have an impact on a national scale or across international borders.

- **Duration of the impact**

The specialist should indicate whether the lifespan of the impact would be short term (0-5 years), medium term (5-15 years), long terms (16-30 years) or permanent.

- **Intensity**

The specialist should establish whether the impact is destructive or benign and should be qualified as low, medium or high. The specialist study must attempt to quantify the magnitude of the impacts and outline the rationale used.

- **Probability of occurrence**

The specialist should describe the probability of the impact actually occurring and should be described as improbable (low likelihood), probable (distinct possibility), highly probable (most likely) or definite (impact will occur regardless of any prevention measures).

The impacts should also be assessed in terms of the following aspects:

- **Status of the impact**

The specialist should determine whether the impacts are negative, positive or neutral (“cost – benefit” analysis). The impacts are to be assessed in terms of their effect on the project and the environment. For example, an impact that is positive for the proposed development may be negative for the environment. It is important that this distinction is made in the analysis.

- **Accumulative impact**

Consideration must be given to the extent of any accumulative impact that may occur due to the proposed development. Such impacts must be evaluated with an assessment of similar developments already in the environment. Such impacts will be either positive or negative, and will be graded as being of negligible, low, medium or high impact.

- **Degree of confidence in predictions**

The specialist should state what degree of confidence (low, medium or high) is there in the predictions based on the available information and level of knowledge and expertise.

Based on a synthesis of the information contained in the above-described procedure, the specialist is required to assess the potential impacts in terms of the following significance criteria:

- **No significance:** the impacts do not influence the proposed development and/or environment in any way.
- **Low significance:** the impacts will have a minor influence on the proposed development and/or environment. These impacts require some attention to modification of the project design where possible, or alternative mitigation.
- **Moderate significance:** the impacts will have a moderate influence on the proposed development and/or environment. The impact can be ameliorated by a modification in the project design or implementation of effective mitigation measures.
- **High significance:** the impacts will have a major influence on the proposed development and/or environment.

The final impact assessment report should at least include the following sections:

- Executive Summary
- Introduction and Description of Study
- Methodology
- Results
- Assessment of Impacts (including mitigation measures to reduce negative impacts and measures to enhance positive impacts and the completion of impact tables)
- Discussion
- Recommendations
- Conclusion

7.2 BRIEFS FOR SPECIALIST STUDIES TO BE UNDERTAKEN AS PART OF THE EIA

7.2.1 TERRESTRIAL IMPACT ASSESSMENT

Peet Botes (PB Consult) was appointed and undertook the Terrestrial Assessment for the proposed amendment – **Appendix 4A**.

The terms of reference for this study include the following:

- Take cognizance of, and comply with, the substantive content requirements outlined within Appendix 6 of GN R982, as amended (i.e. GN 326), which outlines the legal minimum requirements for specialist studies in terms of the 2014 NEMA EIA Regulations, as amended;
- Adhere to the protocols applicable to specialist for environmental impact assessments
- Investigate the area proposed for the solar farm and determine its botanical sensitivity and possible constraints that would prevent solar farm development.
- Described the local and regional context of the vegetation communities and plant species within the affected areas.
- The ecosystem status and conservation value of the vegetation communities, including the whether the potentially affected areas comprise critically endangered or endangered ecosystem(s) listed in terms of Section 52 of the NEMBA;
- Record any rare or endangered species encountered or likely to be or have been present;
- The presence of and proximity of the proposed site to protected area(s) identified in terms of NEMPAA and proximity to a Biosphere Reserve (where relevant) (within, at least, a 20km radius of the site).

7.2.2 HERITAGE IMPACT ASSESSMENT

Agency for Cultural Resource Management was appointed to compile the Notice of Intent to develop to determine if a Heritage Impact Assessment (HIA) will be required for the proposed amendment – **Appendix 4B**.

The terms of reference for the heritage impact study were:

- the identification and mapping of all heritage resources in the area affected;
- an assessment of the significance of such resources in terms of heritage assessment criteria set out in regulations;
- an assessment of the impact of the development on heritage resources;
- an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;

- if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
- plans for mitigation of any adverse effects during and after completion of the proposed development.

Also, the HIA/AIA should comply with the requirements of NEMA, including providing the assumptions and limitations associated with the study; the details, qualifications and expertise of the person who prepared the report; and a statement of competency.

7.2.4 AGRICULTURE AND SOIL POTENTIAL

Dr Johan van der Waals (Terra Soil Science) was appointed to conduct a soil and agricultural potential survey/assessment of the proposed Roma Energy Vanrhynsdorp PV facility within the 20 ha footprint in 2017. This is included as **Appendix 4C**.

7.2.5 VISUAL

Sarien Lategan has been appointed to conduct a Visual Impact Assessment of the proposed amendment development. This is included as **Appendix 4D**.

The objective of the Visual Impact Assessment (VIA) is to determine the significance of any visual impact which may result from the construction of the proposed Roma Energy Vanrhynsdorp PV facility amendment. This assessment will indicate whether from a visual perspective the development constitutes an acceptable level of change and if so, what potential mitigation measures can reduce such impacts.

To determine the potential extent of the VIA required, the following broad criteria are considered.

The potential exists that the construction of the PV facility may have a visual impact. To assist authorities thus to making an informed decision, the input of a specialist is required to assist in the project design and assess the visual impact of the preferred project proposal.

The term visual and aesthetic is defined to cover the broad range of visual, scenic, cultural, and spiritual aspects of the landscape. The terms of reference for the specialist are to:

- Provide the visual context of the site regarding the broader landscape context and site-specific characteristics.
- Provide input in compiling layout/design alternatives.
- To describe the affected environment and set the visual baseline for assessment
- Identify the legal, policy and planning context
- Identifying visual receptors

- Predicting and assessing impacts
- Recommending management and monitoring actions

7.2.6 SOCIO-ECONOMIC

Anelia Coetzee (Leap Sustainable Development) has been appointed to conduct the Socio-economic Impact Assessment of the proposed development. This is included as **Appendix 4E**.

The approach to the study is directed by the requirements for Environmental Impact Assessments and the Guidelines for Social Impact Assessments (SIA) and Economic Impact Assessments commissioned by DEADP Western Cape. Hence the generic guidelines were used to provide a benchmark for the assessment conducted in Matzikama Municipality, Western Cape, close to Vanrhynsdorp. The following activities were executed:

- Review of project information and preliminary social statement as part of other reports, which included:
 - Collection and synthesis of baseline socio-economic data on the area;
 - Identification of project results and key social variables and the impact of the project results on the receiving society and economy, as per Guidelines for Social Impacts;
- Verification of some results, social variables and impacts through communication with the developer, specialists and key project team members, as per bibliography;
- Ascertain significance of impacts through a round of interviews and correspondence with a limited number of community members, specialists and key project team members.
- Rate the confirmed impacts as per recommended scale informed by the results of the interviews with various parties as outlined above.
- Recommending management measures to mitigate the impacts of the proposed development.

8. ASSESSMENT OF ENVIRONMENTAL IMPACTS

The specialist studies detailed in Section 8 were undertaken to determine significance of the impacts that may arise from the proposed development. The findings of the specialist studies are summarised here. Full copies of the studies are included in **Appendices 4A – 4E**.

The following specialist studies were undertaken:

8.1 TERRESTRIAL IMPACT ASSESSMENT

Peet Botes (PB Consult) was appointed and undertook the Terrestrial Assessment for the proposed amendment – **Appendix 4A**.

8.1.1 KEY FINDINGS

The Terrestrial Biodiversity Compliance Statement (**Appendix 4A**), Portion 7 of the Farm De Duinen No. 258 noted that the proposed site has been actively used for grazing. No cultivation has taken place on the site and the primary agents of disturbance on the site are grazing and prolonged periods of drought.

According to the DFFE Screening Tool the Terrestrial Biodiversity Theme Sensitivity is very high because the proposed site is located within an Ecological Support Area 1 (ESA 1) and within the Knersvlakte Centre of Endemism. The proposed site for the amended development is not considered sensitive in terms of terrestrial biodiversity.

At the time of the study a disturbed version of Gannabosveld, dominated by *Salsola zeyheri* (Gannabos), and hardy *Mesembryanthemum* species. Gannabosveld is normally not known to have a high species turnover, but even so, the number of plant species encountered was lower than expected, which is probably a combination of the ongoing drought (leaf succulents being very susceptible to extended dry spells) together with historic and present grazing practices. No plant species of conservation concern were recorded on Portion 7 of the Farm De Duinen No. 258, Vanrhynsdorp.

For a more detailed list of vegetation encountered, please refer to Table 2 of the Terrestrial Biodiversity Compliance Statement (**Appendix 4A**).

According to the National Revised List of ecosystems that are threatened and in need of protection” (GN 47526 of 18 November 2022), Gannabosveld is a Least Threatened ecosystem. According to the 2004 National Spatial Biodiversity Assessment (NSBA), approximately 79% of the Vanrhynsdorp Gannabosveld vegetation remains, with the main reasons for the transformation of the remainder being cultivation and open-cast gypsum mining. A conservation target of 28% has been set for this vegetation type (none of which was formally conserved during 2004), but with the recent proclamation of the Knersvlakte Nature Reserve, some of this vegetation type is now formally conserved.

Because of the small scale of the development, the impact on the CBA, the Knersvlakte Centre of Endemism and Connectivity will be minimal. The vegetation is considered disturbed, and no protected or endangered fauna or flora was observed. In addition, the potential impact on fauna and avifauna is

expected to be very low to insignificant. No mammals, large or small was observed on the larger farm during any of the site visits. As a result, the overall impact on Terrestrial Biodiversity Sensitivity should be Low sensitive.

8.1.2 IMPACT ASSESSMENT

8.1.2.1 Direct impacts

The Direct Impact of the proposed amendment includes the loss of Vanrhynsdorp Gannabosveld within the 20 ha footprint with the possible loss of threatened or protected species.

The direct impact of the proposed amendment on the Terrestrial Biodiversity of the site would be **Low** without mitigation, and with mitigation, **Low**.

8.1.2.2 Cumulative impacts

The proposed Vanrhynsdorp solar and hydrogen plant will be relatively small (<20ha) and will impact only one vegetation type, namely Vanrhynsdorp Gannabosveld. Vanrhynsdorp Gannabosveld vegetation type is not considered vulnerable or threatened with more 79% still remaining in its natural state. Because of its small size, the proposed footprint is unlikely to have any significant impact on connectivity within the ecological support area. Floristically, no protected plant species or red-listed plant species were encountered. In the case of the Vanrhynsdorp Solar site, two other renewable energy sites, within 30km, may impact on the same vegetation type. Both sites are relatively small (10 MW & 20 MW), which should relate to approximately 30 ha in total. Together with the Vanrhynsdorp Solar site it relates to approximately a 40-50 ha impact on this vegetation type out of roughly 540 700 ha (of which almost 79% are still believed to be fairly natural). The impact of the Vanrhynsdorp solar site is thus roughly 0.0018%, while the cumulative impact is roughly 0.0092%.

The cumulative impact of the proposed amendment on the Terrestrial Biodiversity of the site would be **Low** without mitigation, and with mitigation, **Low**.

8.1.3 MITIGATION MEASURES

The terrestrial Biodiversity impact assessment suggests that the proposed Vanrhynsdorp development is expected to have a Low cumulative impact (even without mitigation). The evaluation considers the relatively small size of the proposed development and its location adjacent to existing agricultural land (transformed land).

Even though the impact is already considered low it will still be possible to reduce direct impacts during construction. The potential impact on the regional status of the vegetation type and associated biodiversity features (e.g., corridor function or special habitats) is considered low. No irreversible species-loss, habitat-loss, connectivity or associated impact can be foreseen from locating and operating the solar facility on the proposed site. With mitigation the impact on biodiversity features can be reduced but will stay Low.

The proposed development will result in the permanent transformation of <20ha of natural veld covered by a vegetation type considered least threatened. There are no special habitats within or near the proposed footprint that will be impacted by the development (even though it falls within the Knersvlakte Centre of Endemism). It is highly unlikely that the proposed development will have any significant impact on protected or endangered fauna or flora.

The proposed development is unlikely to result in any significant impact and with good environmental control, the development is likely to result in a Low impact on the environment. With the correct mitigation it is considered highly unlikely that the proposed development will contribute significantly to any of the following:

- Significant loss of vegetation type and associated habitat.
- Loss of ecological processes (e.g., migration patterns, pollinators, river function etc.) due to construction and operational activities.
- Loss of local biodiversity and threatened plant species.
- Loss of ecosystem connectivity in the operational phase, areas that were used in the construction phase as laydown areas but that would not be used later i.e. during the operational phase and beyond, must be rehabilitated. This can be achieved by sowing a suitable mix of grasses onto the disturbed areas.

The proposed development site is not considered sensitive in terms of terrestrial biodiversity. As a result, impact minimisation should focus on mitigation measures during construction (and operational) phases, of which the overriding goal should be to clearly define the final layout and to minimise the disturbance footprint.

- All construction must be done in accordance with the approved construction and operational phase Environmental Management Plan (EMP).
- A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase in terms of the EMP and any other conditions pertaining to specialist studies.

- Before any work is done the footprint must be clearly demarcated. The demarcation must aim at minimum footprint and minimisation of disturbance.
- All alien invasive species within the footprint and or within 10 m of the footprint must be removed responsibly.
 - Care must be taken with the eradication method to ensure that the removal does not impact or lead to additional impacts (e.g., spreading of the AIP due to incorrect eradication methods);
 - Care must be taken to dispose of alien plant material responsibly.
- Topsoil (the top 15-20 cm) must be removed and protected and re-used for rehabilitation purposes of suitable areas on site or within the immediate surroundings (Seedbed protection).
- Lay-down areas or construction camp sites must be located within areas already disturbed or areas of low ecological value and must be pre-approved by the ECO.
- Indiscriminate clearing of any area outside of these footprints may not be allowed.
- All construction areas must be suitably rehabilitated on completion of the project.

8.2 FRESHWATER ASSESSMENT

There are no watercourses or wetlands on or nearby the site. The nearest watercourse is the Droë River, approximately 850m north-north-west of the proposed site.

8.3 HERITAGE IMPACT ASSESSMENT

A Heritage impact assessment including a desktop Palaeontological Impact Assessment (PIA) for the proposed Roma Energy Solar PV Plant (20 ha footprint) on the Farm Duinen 258/7 was conducted in 2012 and the findings were confirmed by Agency for Cultural Resource Management (ACRM) in 2017 (Appendix 4B).

ACRM then submitted a NID for the proposed amendment to HWC in January 2023 (Appendix 4B). (ACRM) was appointed to compile and submit a Notice of Intent to develop for the proposed amendment (Appendix 4B) to confirm if the proposed change will have impacts that were not assessed in the previous 2017 HIA study.

8.3.1 KEY FINDINGS

Based on the NID submitted January 2023 (Appendix 4B), HWC confirmed that there is no reason to believe that the proposed amendment on Portion 7 of the Farm De Duinen No. 258, Vanrhynsdorp will negatively impact heritage resources and no further action under Section 38 (8) of the National Heritage Resources Act (Act 25 of 1999) is required (Appendix 4B).

8.3.2 IMPACT ASSESSMENT

No further impact assessment required for the proposed amendment according to HWC (Appendix 4B).

8.3.3 MITIGATION MEASURES

For the proposed solar and hydrogen amendment, no further Heritage impact assessment or mitigation measures is required.

The following recommendations were made in the previous HIA 2017 (Appendix 4B) for the Archaeological features, taking into consideration any existing or potential sustainable social and economic benefits:

- The footprint area across the northern portion of the site should be re-surveyed once the vegetation has been cleared from the site. Archaeological visibility will be much higher and many more stone tools are likely to be encountered on the ironstone gravels which overlie this portion of the farm. These should be documented before any physical construction takes place on the site, so as to record a more representative sample of the archaeological remains.
- Should any unmarked human burials/remains or ostrich eggshell water flask caches be uncovered, or exposed during construction activities, these must immediately be reported to the archaeologist (Jonathan Kaplan 082 258 0172), or the South African Heritage Resources Agency (SAHRA 021 462 4502). Burials must not be removed or disturbed until inspected by the archaeologist.

The following mitigation recommendations were provided by the previous Palaeontological Impact Assessment 2017:

- Should any substantial fossil remains (e.g. vertebrate bones and teeth, shells, petrified wood) be encountered during excavation, however, these should be reported to SAHRA for possible mitigation by a professional palaeontologist.

8.4 SOIL, LAND-USE AND AGRICULTURAL POTENTIAL REPORT

Dr Johan van der Waals (Terra Soil Science) was appointed to undertake the Agricultural Potential survey in 2017 for the Roma Energy Solar PV Plant (20 ha footprint) on the Farm Duinen 258/7 (Appendix 4C). Terra Soil Science confirmed that the previous Agricultural Potential survey contents and findings are still applicable.

8.4.1 KEY FINDINGS

Terra Soil Science confirmed that the findings of the Agricultural Potential survey 2017 (Appendix 4C) is still applicable and can be applied as is for the updated applications on the site that have similar

impacts. In this regard the solar facility with the added scope of a hydrogen plant will not incur any additional land and agriculture related impacts that needs to be assed.

In the Agricultural Potential survey 2017 it was concluded that the proposed development of a photovoltaic facility (20 ha footprint) on the site will not have significant impact due to the low agricultural potential of the site. The low agricultural potential of the site is the result of the dominance of shallow soils with root development restrictions as well as the very low rainfall of the area.

8.4.2 IMPACT ASSESSMENT

No further impact assessment required for the proposed amendment according to Terra Soil Science (Appendix 4C).

8.4.3 MITIGATION MEASURES

For the proposed solar and hydrogen amendment, no further agricultural impact assessment or mitigation measures is required.

The following recommendations were made in the previous Agricultural Potential survey 2017 (Appendix 4C):

- Erosion must be controlled through adequate mitigation and control structures.
- Impacts from vehicles, such as spillages of oil and hydrocarbons, should be prevented and mitigated.
- Dust generation on site should be mitigated and minimised as the dust can negatively affect the quality of pastures as well as sheep production.

8.5 VISUAL IMPACT ASSESSMENT

Sarien Lategan was appointed to undertake the Visual Impact Assessment for the proposed amendment, and is included as **Appendix 4D**.

8.5.1 KEY FINDINGS

The assessment established that the receiving environment comprises a production landscape i.e. a landscape used for various types and intensity of agricultural use. It abuts an area of natural vegetation. The site slope northward towards the river. The valley has a very gentle slope but the variation in topography is sufficient to absorb facilities of low vertical extent such as proposed.

The development of the facility will change the character of the area, but the small size of the development reduces the significance. Due to the distance from town, the impact is not significant.

The area does not hold very unique or specific visual quality of high significance.

The modelled viewshed is small and restricted due to the topographic character of the landscape. Due to dry conditions and the cold Atlantic air moving over the dry hot landscape, the air has a hazy quality which makes the distinction of element in the distance difficult. This adds to the absorption capacity of the area.

The identified potential receptors (Figure 12) were analysed (Table 5) and the finding was that none display a high visual significance and therefore the overall visual impact of the proposed project is low. Due to the low impact, no mitigation measures are required for the proposed amendment.

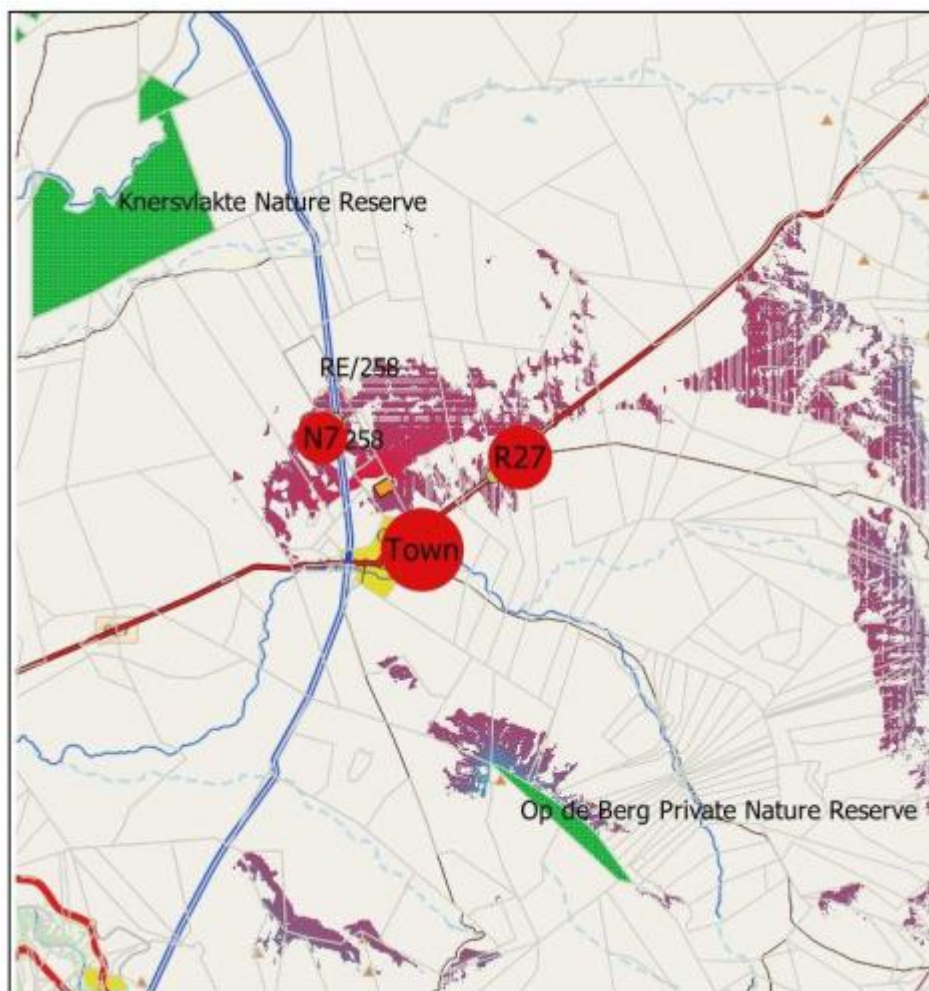


Figure 13: A map indicating the receptors analysed for the visual impact assessment

Table 5: Potential Receptors

Potential Receptor	Comment
N7	Partially screened by landscape. Only small section within viewshed
R27	Partially screened by landscape. Small section close to town and Vanrhyns pass within viewshed
Town and Residential area	Closest residential area approximately 1.5km from the site. Town outside viewshed
Nature Reserves / Protected Areas	The Knersvlakte Reserve is outside the viewshed. Oorlogskloof Nature reserve is on the plateau. The town of Vanrhynsdorp is in the distance. Op die berg Reserve. The facility is on the northern slope and would hardly be visible from the reserve

8.5.2 IMPACT ASSESSMENT

8.5.2.1 Visual Receptors

The impacts on the receptors identified above are assessed as follows:

Receptor 1: N7 as receptor

Approaching from the north, site comes into view to the left. The solar arrays however front north which implicates that the observer has a sideview of the panels. The hydrogen plant will be behind the arrays and visible similar to fuel tanks.

N7 has been identified as the Cape to Namibia tourist route and from this perspective any changes in the view corridor are important and need to be evaluated as to how it impact on tourism. The impact assessment for the N7 receptor is summarised in Table 6.

Table 6: Assessment summary of the N7 receptor

Criteria	High	Moderate	Low
Exposure	Dominant, clearly visible	Recognizable to the viewer	Not particularly noticeable to the viewer

Sensitivity	Residential, nature reserves, scenic routes	Sporting, recreational, places of work, Highway	Industrial, mining, degraded areas
Intrusion/Obstructive	Noticeable change, discordant with surroundings	Partially fits but clearly visible	Minimal change or blends with surroundings

Receptor 2: R27 as receptor

The site is barely visible from the R27 in a westerly approach. The low rises screen the view and the hazy air makes view of distant objects difficult.

Descending the Vanrhynspass, the town of Vanrhynsdorp is not visible due to the distance and hazy air due to dust or fog which is a daily occurrence. Due to the low extent of the facility close to the town boundaries, should the town be visible on a clear day, it would hardly be distinguishable at this distance. The impact assessment for the R27 receptor is summarised in Table 7.

Table 7: Assessment summary of the R27 receptor

Criteria	High	Moderate	Low
Exposure	Dominant, clearly visible	Recognizable to the viewer	Not particularly noticeable to the viewer
Sensitivity	Residential, nature reserves, scenic routes	Sporting, recreational, places of work, Highway	Industrial, mining, degraded areas
Intrusion/Obstructive	Noticeable change, discordant with surroundings	Partially fits but clearly visible	Minimal change or blends with surroundings

Receptor 3: Town and Residential area as receptor

The town of Vanrhynsdorp is situated in the valley and is not within the viewshed. It is only the northern extensions that are situated on the rise to the north and approximately on the same level than the project. The project is however on the downward slope and thus the project would be below the horizon from the observers position. Structure of more than 3m in height may be visible. The

intrusion level is very low. The impact assessment for the town and residential area receptor is summarised in Table 8.

Table 8: Assessment summary of the town and residential area receptor

Criteria	High	Moderate	Low
Exposure	Dominant, clearly visible	Recognizable to the viewer	Not particularly noticeable to the viewer
Sensitivity	Residential, nature reserves, scenic routes	Sporting, recreational, places of work, Highway	Industrial, mining, degraded areas
Intrusion/Obstructive	Noticeable change, discordant with surroundings	Partially fits but clearly visible	Minimal change or blends with surroundings

Receptor 4: Nature Reserves / Protected Areas as receptor

The Knersvlakte Nature reserve is outside of the viewshed.

The Op die berg reserve face to the east, but hiking trails to extent to the northern edge of the Maskam mountain. The town is visible from the point. The facility may be visible but due to the orientation of solar arrays to the north, it will not create a glare towards this viewpoint.

The Oorlogskloof Nature reserve is on top of the mountain to the east and the views from the edge of the plateau will be similar to the R27 Vanrhynspass assessment. The impact assessment for the Nature Reserves / Protected Areas receptor is summarised in Table 9.

Table 9: Assessment summary of the Nature Reserves / Protected Areas receptor

Criteria	High	Moderate	Low
Exposure	Dominant, clearly visible	Recognizable to the viewer	Not particularly noticeable to the viewer
Sensitivity	Residential, nature reserves, scenic routes	Sporting, recreational, places of work, Highway	Industrial, mining, degraded areas
Intrusion/Obstructive	Noticeable change, discordant with surroundings	Partially fits but clearly visible	Minimal change or blends with surroundings

	surroundings		surroundings
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Overall impact

The overall impact on receptors is **Low** and no mitigation measures are required.

Construction Phase

During construction, various large earth moving equipment and equipment will be transported to the site and work on the site. This will impact on the general experience of viewers. This impact is however temporary and not uncommon during construction of infrastructure. Communities have fairly high tolerance levels for such activities if it contributes to the infrastructure of the area.

The Visual Impact is rated as **Low**.

8.5.2.2 Cumulative Impacts

All approved Renewable projects within a 30km radius was taken into account for the Visual cumulative impact assessment (Figure 14). Note that the area to the north of the current application was added by default in the database since the Remainder of the Farm No. 258 consists of two portions. Only the southern section was approved and the northern section was not part of the original application approved. The current application is an amendment of the approved application for the southern section of the Remainder of the Farm No. 258.

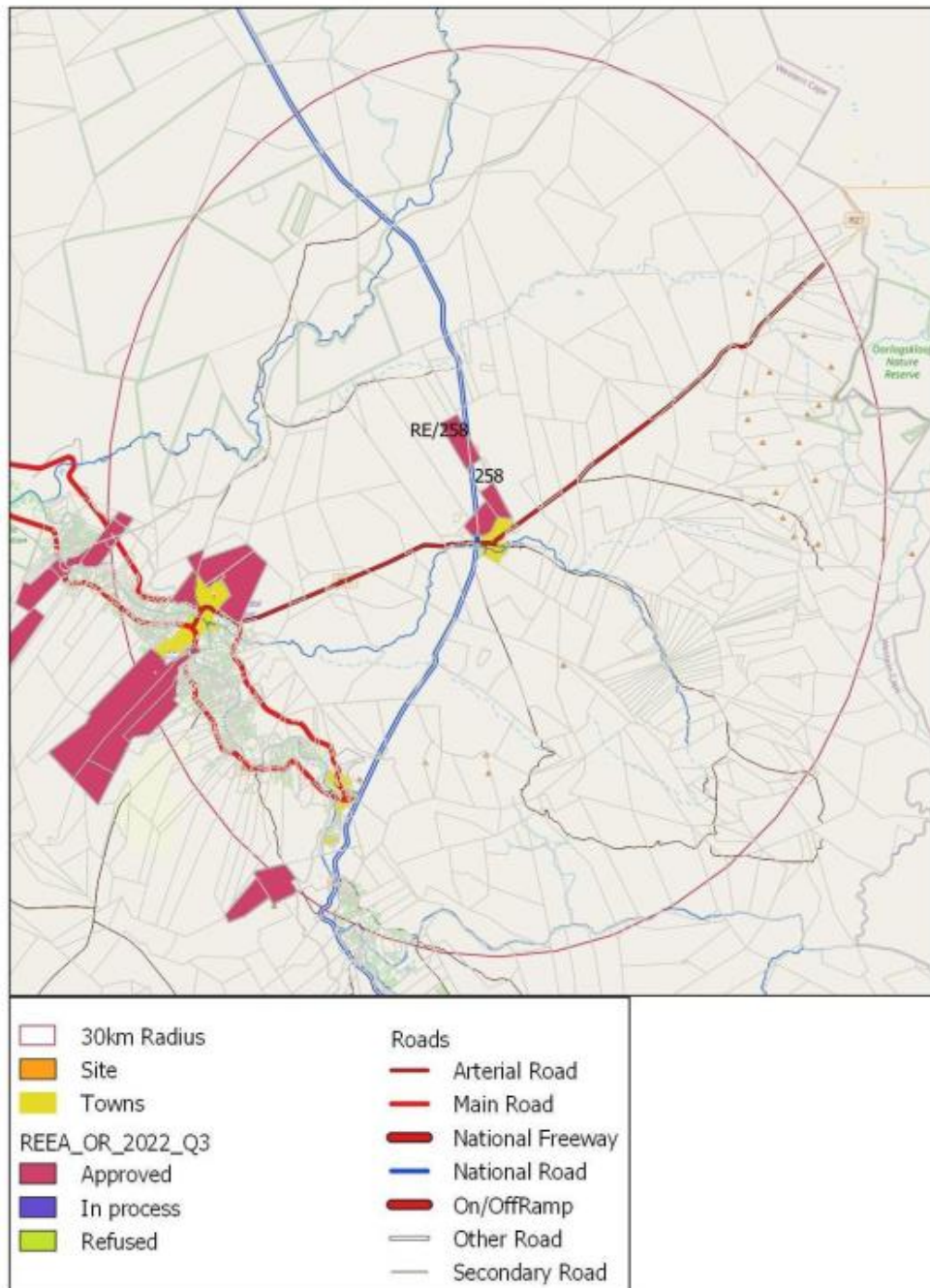


Figure 14: Map of the existing renewable energy projects within 30 km of the proposed solar amendment development

The cumulative impact of the proposed amendment is low due to the small footprint as well as similar small footprint of adjacent approved project.

8.5.3 MITIGATION MEASURES

Due to the low level of impact, no mitigation measures are required.

8.6 SOCIO-ECONOMIC IMPACT ASSESSMENT

Anelia Coetzee of Leap Sustainable Development was appointed to undertake the Socio-economic Impact Assessment for the proposed amendment and is included as **Appendix 4E**.

The Socio-Economic Impact Assessment evaluates the intended (direct and indirect impacts) and unintended (residual) consequences on the human and natural environment caused by the proposed solar and hydrogen facility. Management measures are proposed to mitigate these consequences.

8.6.1 FINDINGS (SOCIO-ECONOMIC OVERVIEW)

According to the Socio-economic Impact Assessment (**Appendix 4E**), the following is an overview of the socio-economic conditions of the Matzikama Local Municipality.

- Demographics

In 2021, the Matzikama Local Municipality had a total population of 72 759 and approximately 21 172 households with an average household size of 3.8 people per household. (Matzikama SEP, 2021).

According to StatsSA2011, 37.5% of households have partners who are married or either living like married partners. Thus, 62.6% of households are single parents according to different variables such as: never married (56.6%), widow/widower (4.2%), separated (0.5%) and divorced (1.3%). The population of the municipal area is quite evenly distributed in terms of gender with 49.9% representing females and 50.1% representing males. The population of Matzikama is relatively young with the Youth (0-14) making up 26.8% of the total population, the Working Age Population (15-64) making up 66.9% of the total population and the Elderly (65+) making up 6.3% of the total population.

- Education

In 2019, Matzikama had a total of 27 schools which decreased to 26 in 2020. A similar trend is noted for nofee schools, with the number decreasing from 21 in 2019 to 20 in 2020. The learner enrolment in Matzikama has increased from 10 673 in 2019 to 10 837 in 2020 and then to 10 949 in 2021. The Matric Pass Rates between 2018 and 2021 have been inconsistent with 77.6% being recorded in 2018, 84.5% being recorded in 2019, 82.5% being recorded in 2020 and 83.3% in 2021. When compared with the rest of the West Coast District, Matzikama recorded the second-best pass rate in 2021. Although the Matzikama area had the third highest (72.1%) retention rate in the district in 2020, school drop-outs remain a grave concern. The retention rate increased to 73.5% in 2021. The learner

teacher ratio in 2020 was 29.7 and in 2021 it was 29.0. (Source: Matzikama SEP, 2021 & MERO West Coast District, 2022-2023)

According to Stats SA 2011, of those aged 20 years or older, 8.9% have completed primary school, 39.1% have some secondary education, 20.3% have completed matric and 6.9% have some form of higher education.

- Economy

According to Stats SA, 2011, 55.7% of the households within the municipal area earned less than R3 500 per month and as indigent households, qualify for subsidized housing and free civil and electrical services provision.

- Labour Market

Of the total working age demographic (15-64), 53% fall under Employed, 35.5% fall under Not Economically Active, 8.7% fall under Unemployed and 2.9% fall under Discouraged Work Seeker. The unemployment rate for Matzikama was 13.3% in 2020 and estimated to have increased to 16.4% in 2021.

- Sector employment, contributions and composition

In 2020, the municipal area had 26 057 employed workers. Of the employed workers, 20.9% were employed in the informal sector and 79.1% were employed in the formal sector. The majority of the formally employed people in the Matzikama municipal area consist of low-skilled workers, which represents 41.8% and semiskilled workers, which represents 24.8% of the total formally employed workforce. The number of skilled workers who are formally employed amount to 12.5% of the total.

- Sectoral Contributions and Composition

In 2020, the Agriculture Sector remained the largest contributor to the Matzikama Local Municipality's GDP with a figure of 25.1%. The Trade Sector's contribution, despite its contraction, remained the second largest contributor with a figure of 13.9%. This is then followed by the Finance Sector (13.3%), then the Manufacturing Sector (13%), then the General Government Sector (10.9%) and then the Community Services Sector (9.2%). The sectors that contributed the least were: the Transport Sector (5%), the Construction Sector (3.4%) and lastly the Electricity, Gas and Water Sector with 2%.

The Matzikama Local Municipality approximately contributed R4 470 million to the economy and GDP of the West Coast District.

- Access to Basic Services

In 2019, of the total households, 68.4% had their refuse removed weekly, 88.1% had access to electricity for lighting, 96.3% had piped water inside the dwelling and 69% had access to a flush/chemical toilet.

- Health and Health Facilities

In 2020, the Matzikama municipal area had 5 primary healthcare facilities, which comprised of 5 fixed clinics; there were also 13 mobile/satellite clinics, 9 ART clinics. In addition to these primary healthcare facilities, there is also 1 district hospital.

Child Health or the health of new born or children under 5 years of age has experienced an overall decline in numbers from 2019 to 2020:

- The immunization rate increased from 66.4% to 77.7%.
- The number of children malnourished under 5 years (per 100 000) decreased from 2.2 to 1.6.
- Neonatal Mortality Rate (NMR measures the number of deaths within the first 28 days of age per 1000 live births) increased from 9.6 to 11.8.
- Low birth weight indicator (babies born weighing less than 2.5kg) decreased from 16.5% to 13.6%.

Maternal Health numbers in 2020 were as follows:

- Maternal mortality rate (deaths per 100 000 live births) remained at zero deaths.
- The delivery rate of woman under 20 was recorded at 15.5.
- The termination of pregnancy rate remained constant at 0.5%.

(Source: Matzikama SEP, 2021)

Safety and Security

The number of different criminal offences in 2021 was as follows:

- The number of murders increased from 17 in 2019/20 to 21 in 2020/21.
- The number of sexual offences increased from 100 in 2019/20 to 102 in 2020/21.
- The number of drug-related offences decreased from 502 in 2019/20 to 499 in 2020/21
- The number of cases of driving under the influence of drugs or alcohol decreased from 154 in 2019/20 to 127 in 2020/21.
- The number of residential burglaries increased from 312 in 2019/20 to 373 in 2020/21.

- Poverty

Living conditions (standard of living) are measured by means of indicators including GDP per capita, Income Inequality and Human Development Index (HDI) and this is used to show the current reality of

households residing in the Matzikama municipal area based on most recent data by Quantec Research, 2021.

An increase in real GDP per capita, i.e., GDP per person, is experienced only if the real economic growth rate exceeds the population growth rate. Even though real GDP per capita reflects changes in the overall well-being of the population, not everyone within an economy will earn the same amount of money as estimated by the real GDP per capita indicator. At R59 347 in 2020, Matzikama's real GDP per capita is below that of the West Coast District's figure of R69 251, and below the Western Cape Figure of R84 967.

The Gini coefficient is a numeric measuring tool to measure inequality in a geographic region by calculating how wealth is distributed in the population of said region. From this calculation a result 0% (ideal equality) to 100% (total inequality) is derived. The National Development Plan (NDP) has set a target of reducing income inequality in South Africa from a Gini coefficient of 0.7 in 2010 to 0.6 by 2030. However, between 2015 and 2020, income inequality has worsened in the Matzikama area, with the Gini-coefficient increasing from 0.56 in 2014 to 0.60 in 2020. Worsening income inequality could also be seen across the West Coast District with 0.57 in 2014 and 0.61 in 2020.

The Human Development Index (HDI) is a composite indicator reflecting on education levels, health, and income. It is a measure of peoples' ability to live a long and healthy life, to communicate, participate in the community and to have sufficient means to be able to afford a decent living. The HDI is represented by a number between 0 and 1, where 1 indicates a high level of human development and 0 represents no human development. The United Nations uses the Human Development Index (HDI) to assess the relative level of socio-economic development within countries. There has been a general increase in the HDI for the Matzikama area, from 0.67 in 2017 to 0.74 in 2020. There has been a similar upward trend for the West Coast District as well as for the Western Cape. (Source: Matzikama SEP, 2021).

8.6.2 IMPACT ASSESSMENT

The Socio-economic Impact Assessment (**Appendix 4E**) has identified the following impacts of the proposed development:

8.6.2.1 Direct Impacts

1. Impacts on Population and Family Characteristics of Receiving Community

a) Population Influx, Community Stability and Homogeneousness

The construction phase of the proposed solar and hydrogen facility development will impact on the population of Vanrhynsdorp and its immediate surroundings and cause an influx of skilled people temporarily and permanently as they come to work on the construction site and come to look for work. The influx of people may result in a socially less stable community and higher levels of migration (people staying in Vanrhynsdorp for less than 5 years).

The number of jobs generated during construction was calculated as thirty (30) persons being employed during the construction period of six (6) months. Of these who does construction work, 56% (or 17 people) are unskilled, 38% (or 11 people) are semi-skilled and 6% (2 people) are skilled. The installation and development contractor are most likely from the Western Cape. These jobs include, but are not limited to site clearing, fencing, general construction work (boxing, concrete mixing and casting), digging trenches, creation of fire breaks and operating the construction vehicles.

The no go alternative has no impact on the population of Vanrhynsdorp and its immediate surroundings.

The influx of skilled and semi- skilled people has a low negative impact locally. However, locals may acquire related skills or follow related careers as different job options are introduced to the local community.

b) Skills levels

Skills levels and skills capacity will increase. Those with newly acquired skills may leave the area as new projects in surrounding areas are implemented or as outsiders may be employed to do the job. Job seekers may join the community and impact on safety and security and the stability of the society.

The skills levels within the Matzikama municipal area are low as in 2011 12.5% of the working age population are skilled, 24.8% are semi-skilled and 41.8% are un-skilled (MERO, 2022 & Stats SA, 2011).. Keeping these skills levels in mind, it is likely that most locals from Matzikama will be employed but that the receiving community may not have the skills required as outlined at the start of this section. Implementing capacity building and skills development training programmes will benefit the community in the short term and long term. As people get trained their skills level and income will increase and their economic and material well-being will improve.

Obtaining skills will enable community members to find work at future construction projects or to do maintenance within the settlement, the municipality and the region. The creation of the opportunity to work and to receive training and skills development will cause more jobseekers to settle in

Vanrhynsdorp and immediate surrounding communities. The influx of jobseekers may cause societal tension and instability particularly if the unemployment rates stay high and locals do not find work.

The impact of the skills increase is low positive, and stay low positive after mitigation. Creating skills development opportunities for locals, is viewed significantly positive given the challenge of unemployment in the municipality and in the province. Moreover, skills are a long-term investment.

c) Family Structure Change

As more family members find employment and contribute to the household income, the household structure may change. Vulnerable groups earning an income would be able to look after themselves or contribute to the household's finance. Their contribution either enables them to leave the family or to contribute to other family member(s) taking care of other vulnerable persons in the family that cannot work or to employ someone to assist them caring for the family.

Should no provision be made to break the cycle of hopelessness, youngsters will stay part of the household and unemployed.

Being employed and developing skills enable youngsters to keep up their self-esteem and changes in family structure may take place i.e. releasing some family members to work and/or some to dedicate time to the family's wellbeing. This result, obtained over a longer period of time, will be indirect but positive.

2. Political, Social and Community Resources within Receiving Community

a) Employment Opportunities

With an estimated Capital Expenditure of ±R285 million to develop the 10MW and the expected value of construction and employment over ±6 months is ±R40 million. Not less than ±R3.4 million should benefit previously disadvantaged individuals. The number of jobs generated during construction was calculated as thirty (30) persons being employed during the construction period of six (6) months. Of these who does construction work, 56% (or 17 people) are unskilled, 38% (or 11 people) are semi-skilled and 6% (2 people) are skilled. The installation and development contractor are most likely from the Western Cape. These jobs include, but are not limited to site clearing, fencing, general construction work (boxing, concrete mixing and casting), digging trenches, creation of fire breaks and operating the construction vehicles.

The average number of direct jobs the development will create 30 direct jobs for the period of 6 months. Ninety percent (90%) of those jobs should be reserved for locals. Thus, the project will result

in an increase of 27 local people employed in the Construction sector which is a secondary economic sector. Of those employed, 15 would be unskilled, 10 would be semi-skilled and 2 would be skilled.

Given the Matzikama municipal trend of employed, unemployed, discouraged work seekers and economically not active people, the same trend should be found in Vanrhynsdorp. In 2011 there were 66.4% (48 468 people) in Matzikama that are of working age, 11.7% (5 190) unemployed and discouraged work seekers and 35.5% (15 951) that are not economically active with the balance (23 806) being employed. In 2020, the number of employed persons increased to 26 057. Of the employed workers, 23.9% were employed in the informal sector and 76.1% were employed in the formal sector.

Though number of employment opportunities represents less than one percent (1%) of the unemployed (5 190 or 11.7%) and the employable population, the number of jobs generated by the proposed solar and hydrogen facility contributes to decrease the unemployment rate, though in the short term.

The community views and rates creating jobs as significant as unemployment in the municipal area are high. The employment of working age people affects the economic environment, as the relationships between people at an individual, family and community level are directly affected. The increase in the number of jobs is positive, and the significance of the impact is rated low at a local level before and after mitigation. The No go alternative has no impact.

b) Increased use of Social Amenities and Municipal Services

Health amenities, i.e., the local clinic, local doctors and regional ambulances will be utilized should a construction-related accident during work or at home happens. It is anticipated that any serious emergencies will be routed to Vredendal, Paarl and Cape Town. However, the likelihood of emergencies on site occurring is unlikely as national safety standards will have to be adhered to.

The temporary stay of the non-local construction team will add negligible pressure on the demand for basic services i.e., water, sewerage and electricity and removing refuse.

Demand for municipal traffic and administrative services may increase on a sporadic basis as abnormal loads have to be transported.

The use of social amenities and services affects the social and the economic environment, as the relationships at community level are directly affected.

The impact of the temporary construction team on amenities and municipal services is low, yet the intensity is negative. After mitigation the probability of the impact becomes less and the level of significance decreases causing the impact to be nearly neutralized. The No Go alternative will have no impact.

c) Increased traffic levels

The construction of the proposed development should be accommodated in the day-to-day traffic. It is unlikely that upgrades will be required as a result of future background traffic volumes following the construction.

During the construction and assembly phase, construction vehicles (graders, TLB's and cement trucks etc.) would be used. These vehicles would stay onsite and their impact on the roads through and surrounding Vanrhynsdorp will be minimal as most of these vehicles will be transported to the site. Vehicles transporting goods, materials and equipment would make use mainly of the N7, R27 and municipal roads and associated gravel and private roads.

The number of truckloads of materials has not as yet been determined but with appropriate scheduling of deliveries the impact can be mitigated.

Construction workers would be transported to site in approximately six vehicles per day, twice a day resulting in maximum of 12 trips per day whilst another 3 – 4 service vehicles will visit the site daily. An average of 15 trips will be generated, constituting an impact of low significance. Although the trip frequency is low, the road surface on the farm on which the site is located is likely to deteriorate and should have to be maintained.

There may be an increase in traffic on foot or non-motorized traffic to reach the site.

The increase in traffic/ decreased safety affects the social environment and the relationship amongst the community indirectly.

The slow-moving vehicles (trucks with loads) may impact on road safety on the R27 road running through Vanrhynsdorp. Road signs, erected to address the additional impact of the slow-moving vehicles and employees on foot (pedestrians), will neutralize this impact and conflicts that may arise at junctions to high order roads such as the N7.

The intensity of the impact caused by the increase of traffic is negative and of low significance. Mitigation measures will assist to decrease in the negative impact to become very low in significance. The No Go alternative will have no impact.

d) Crime

Whilst the material well-being of the community improves, the presence of contractors creates the opportunity for those who want to commit crime, to do so. As more disposable income is at hand, other social ills such as substance abuse may increase.

The common crimes include substance abuse, theft and drunken driving. It is unlikely that crime will increase directly because of the construction of the proposed solar facility.

Irrespective of local or "others" be employed, there is the perception that increased crime, trespassing on the neighbouring farms, livestock and petty theft, human trafficking, littering, drunken driving and illegal vending may be experienced. The perception that crime will increase provides criminals, not the locals or employed outsiders, the opportunity to commit crimes.

Mitigation include demarcated work areas, security control and movement restriction limited to the site only.

The proposed amendment may lead to increased crime and substance abuse and impacts slightly negatively on the receiving community. Although the probability is low, mitigation measures are proposed.

3. Health and Social Well-being**a) Increased noise and dust levels**

Sporadic increases in the dust and noise levels will occur during the construction period for short intervals. Dust and noise may impact on the health of employees and inhabitants of Vanrhynsdorp in immediate proximity of the solar and hydrogen facility. Dust and noise suppression can be applied as mitigation measure to maintain the standard of health for employees on site.

The location of the proposed solar facility is removed from the town environment and will not cause an impact on the receiving community.

The impact of dust and noise is low negative as it occurs over short intervals and is unlikely to affect the immediate community of Vanrhynsdorp. Mitigation will neutralize the impact as the likelihood of the impact to occur, becomes less.

The No Go alternative has no impact.

b) Increased household Income

The proposed development will lead to an improved standard of living due to the employment opportunities provided.

During the Construction Phase, the 27 members of local households that found employment as a result of the proposed amendment will benefit as there will be a stable and most likely increased income for 6 months.

The average household income overall is low as 55.7% of the population earns R38 400 (maximum R3 200 per month) and less, whilst 29.6% earns between R38 401 and R153 800 (maximum R12 800 per month) and 14.6% earn more than R12 800 per month.

The construction phase will bring about jobs for some locals that will result in an income for six (6) months. Generally, the income earned would be higher than other contract unskilled and semi-skilled work. The expected value of employment over six months is ±R3.4 million. Not less than ±R3 million should benefit previously disadvantaged individuals.

The increased income affects the economic and social environment and the relationships between family members directly.

The construction of the proposed solar and hydrogen facility will impact positively on the income of households employed locally and regionally, and the significance of the impact is rated low before and after mitigation. The impact will bring about changes in the economic and material well-being of the local community.

The No Go option will have no impact.

c) Increased Sales and Gross Domestic Product (GDP)

During the construction phase, the general project purchases i.e., most building materials, fuel and domestic purchases, such as groceries, liquor and restaurant services will be purchased locally. This will cause the sales volumes (direct and indirect) to increase. The panels and related equipment will be purchased internationally. The impact on increased international sales is not assessed, as the assessment focused on the local GDP.

It is anticipated that the contribution by the proposed solar and hydrogen facility to the Matzikama Municipality, 2020 GDP of R4 470 million (nearly R5 billion) could be as much as ±R285 million but is

unlikely as most of the equipment for the proposed facility will be purchased in imported whilst some of the materials will be purchased in Western Cape province and contribute to its GDP of R 648.82 billion in 2021 (<https://tradingeconomics.com/south-africa/gdp-constant-prices>, accessed Dec 2022 and Stats SA 2016). However, Matzikama should experience the impact of salaries constituting ±R3.4 million, to establish the solar and hydrogen facility and being spend within the region. The development of the solar and hydrogen facility has a low contribution to the GDP of Matzikama and the increase in sales volume is rated as moderate.

The improvement of the economy, measured by the contribution in Gross Domestic/ Geographical Product (GGP) of Matzikama in 2020, reflects as low.

The No Go alternative has a low impact.

8.6.2.1 Residual Impacts

1. Women and young people's self-esteem improves

Job reservation for youth and for women provides them with a different meaning of their role in society.

Young people and women often do not have the skills and experience and are excluded from the local labour component. Should young people and women be employed it may assist to break the cycle of hopelessness. The self- image of the youth and women improves as well as the way the community views them. Demographically 60% young people should be employed by the proposed amended development and half of these jobs should be earmarked for woman.

Job reservation for the youth and women will cause the youth and women to have improved self-esteem (amongst them and within the community). This improved self-esteem initiated and generated during the construction phase should be maintained and strengthened during the operational and demolition phases. As job opportunities would be limited during the operational phase, the solar and hydrogen facility should support a service to assist youth to access job opportunities within other significantly contributing economic sectors i.e. tourism and government services (municipal workers). To ensure that the project's impact would reach beyond the construction phase, bursaries and seed capital for entrepreneurs should be made available and an education and skills facility should be established to afford youngsters and women the opportunity to improve their future options. These opportunities and enabling youngsters and women to pursue such opportunities will enhance self-esteem.

The opportunity afforded to youth and women to improve their skills and education consequently enable youth, women and their families to hold youth and women in a position of higher esteem than when unemployed has a positive impact during all phases and changes to moderately positive after mitigation.

Although the significance of the impact is low before mitigation and change to moderate after mitigation, the change experience in the social wellbeing of youth and women undoubtedly will change the social wellbeing of families. Therefore, the impact is viewed as significant. The proposed mitigation measures may likely contribute to improved family cohesion, closer extended family networks and acknowledgement of traditional roles played by family members. It will provide families hope. The impact changes to medium positive after mitigation.

2. Residual: Institutionalization of school support to improve levels of education

Youngsters and particularly girls are afforded an opportunity to improve their skills and education as an educational School Support Programme is institutionalized. The social welfare of young people improves as the dropout rate, particularly in high school, decreases.

The education and skills levels of the population in the Matzikama region are low, the receiving community may not have the skills required. Due to the receiving community not having the skills required to be employed, capacity building and skills development training programmes should be implemented to benefit the community in the short term and long term.

Opportunity should be afforded to learners to access education and skills development. As mitigation measure(s) the solar and hydrogen facility development should strive to implement the following:

- Require contractor to put mechanisms in place to enable locals to access jobs offered by the proposed solar and hydrogen facility development.
- Require the contractor to enhance formal and informal skills transfer:
 - Should skilled persons from outside the community be employed, the developer should consider implementing a training and skills development programme to enhance the opportunities for local historically disadvantaged individuals in the construction industry. Measures should be put in place to ensure successful training and development i.e., structured job shadowing and learnerships. Such a programme should be offered in liaison with an accredited Further Education and Training College like West Coast College with a satellite in Citrusdal.

- Some basic skills can be tutored at school level in a joint venture established by the developer between the primary schools in Vanrhynsdorp and the schools or education and skills training providers. In the long term (generationally) the improved skills level will ultimately lead to improved levels of education.
- An “access to education support service” assisting future students should be considered attending to application fees for bursaries, career and financial planning and strategies for the period of studying.
- The proposed development should invest in teacher training to offer scarce subjects such as mathematics, science and physical science. Besides investing in teacher training the proposed development should fund the tuition of the scarce subjects.

The improved circumstance for youngsters to prepare themselves for life will impact moderately positively and will give young people hope. As young people get the opportunity to improve their education, self development opportunities and income will increase and their economic and material well-being will improve.

No further mitigation measures are proposed and the impact stays medium positive.

The No Go alternative has no impact.

8.5.2.3 Cumulative Impacts

The cumulative impact associated with the proposed solar and hydrogen energy facility is largely of a visual nature and loss of agricultural land.

The presence of the PV panels on stands and the hydrogen plant and associated infrastructure and the associated impact on the sense of place of the surroundings was rated low. The significance of the visual impact, specifically the impact on the local sense of place, of the other facilities within the 30km radius is also rated as low as these facilities are located around Vredendal. The two settlements and the renewable energy facilities are not visible from one settlement to another.

The cumulative loss of agricultural land has a low impact as low potential agricultural soils that can only be used for grazing were selected for the different sites. The loss for agriculture relates to loss of grazing capacity which is not significant.

This study does not assess the overall cumulative impact i.e., the optimal number and location of solar facilities in the area, on the rural character and the sense of place of the surroundings or the agricultural ability and carrying capacity of the area.

No Go Option

The No-Go Option would lose an opportunity for South Africa to help meet its current energy needs with clean, renewable energy and achieve its targets. Not reaching its targets and being one of the highest per capita producers of carbon emissions in the world (80% emission for energy use vs. 49% for developing countries) this option represents a negative impact socially and environmentally.

Furthermore, the No-Go option will also:

- a) Result in a loss of employment opportunities generated during construction and operations.
- b) Result in no social investment to support specific social (improvement of education in scarce subjects) and economic (enhancing small businesses) initiatives as identified by the specialist studies and developers.

This option represents a negative social cost particularly for the local community.

8.6.3 MITIGATION MEASURES

According to the Socio-economic Impact Assessment (**Appendix 4E**), in order to ensure that the disadvantages are managed to maximize positive impacts, specific management strategies and mechanisms need to become part of the proposed development of which some are already practiced as they are required by legislation applicable to the proposed development.

These strategies and mechanisms need to be implemented through development conditions pertaining to:

1. Preferential procurement of goods, services and labour,
2. Skills transfer
3. Security control
4. Safety Management
5. Traffic Regulation
6. Dust and noise control
7. Enhancing the economy
8. Maintaining Sense of place and Conservation Management
9. Protect Agricultural land and activities
10. Maintaining Social benefits
11. Mitigating Retrenchments.

To implement the strategies and mechanisms, the development should enable the administration thereof. The administration of the strategies and mechanisms should be in partnership with the local authority.

The recommendations follow below.

1. Preferential procurement of goods, services and labour

Construction, Operation and Demolition Phases:

- Contractors, employing or seeking to employ local HDIs who are suitably qualified, should get preference;
- The municipality, local community and local community organizations should be informed of the project and potential job opportunities by the developer;
- The developer should, where necessary, assist local HDI owned firms to complete and submit the required tender forms on condition that local labour is used;

Construction and Operation Phase:

- Reserve a number of jobs for women and youth: Ensure contractor employ at least 90% locals of whom 80% were previously disadvantaged.
- Facilitate mechanisms to enable women and youth to access employment.
- Pay men and women doing and youth the same job, equally.
- Ensure that women gain equal access to training and education opportunities that men do.

Construction and Demolition Phase:

- A database of locally based firms, including SMME's owned and run by HDIs that qualify as service providers (construction companies, catering companies, waste collection companies, site cleaning companies etc.) should be compiled by the developer prior to the commencement of the tender process. These firms should be invited to bid for tenders;
- Establish a Monitoring Committee for the construction and decommissioning phase in collaboration with representatives of the local community. The Monitoring Committee has to ensure that the proposed solar and hydrogen facility is implemented and that any problems that arise which are associated with the construction and decommissioning phase are addressed.
- Developer and contractor to act as reference for locals employed.
- Developer and contractor to liaise with existing or future projects to access employment for locals.

-
- Reserve a number of jobs (90%) for local labour (un- & semi-skilled labour).
 - Facilitate mechanisms to enable locals to access employment and learning opportunities offered by the proposed solar and hydrogen facility.

Operation and Demolition Phase

- Developer and contractor to act as reference for locals employed.
- Developer and contractor to liaise with existing or future projects to enhance employment opportunities for locals.

2. Skills transfer

Construction Phase:

- The proposed development should enhance formal and informal skills transfer:
 - Should skilled persons from outside the community be employed, the developer should consider implementing a training and skills development programme to enhance the opportunities for local historically disadvantaged individuals in the construction and maintenance industry. Measures should be put in place to ensure successful training and development i.e., structured job shadowing and learnerships. Such a programme should be offered in liaison with an accredited Further Education and Training College like the West Coast College or University.
 - Some basic skills can be tutored at school level in a joint venture established by the developer between the primary schools in Vanrhynsdorp and the schools or education and skills training providers. In the long term (generationally) the improved skills level will ultimately lead to improved levels of education.
 - An “access to education support service” assisting future students should be considered attending to application fees for bursaries, career and financial planning and strategies for the period of studying.
- The proposed development should invest in teacher training to offer scarce subjects such as mathematics, science and physical science. Besides investing in teacher training the proposed development should fund the tuition of the scarce subjects.

Operational Phase:

- Skills transfer and development, formally and informally, should be implemented together with local education and skills training providers (e.g., job shadowing).
- Facilitate mechanisms to enable local young people to access the educational opportunities to attend courses in scarce subjects.
- Ensure local employees do benefit from on-the-job training.
- The educational opportunities should include formal and informal education.

- On successful completion of subjects and courses, opportunities to access further education should be made accessible.
- Facilitate mechanisms to enable local young people (who are not necessarily employed) to access the skills training opportunities.
- On the job training should include formal and informal training opportunities.

3. Security Control

Construction phase:

- Regularly alternated twenty-four-hour security to guard the development.
- Documentation of all movement and vehicles entering and leaving the premises.
- Regular searching of all vehicles entering and leaving the premises.
- No persons not concerned with the development to enter on the premises.
- Limit access points to one point.

4. Safety Management

Construction and Demolition Phases:

- Adhere to international construction health and safety standards and precaution measures.
- Provide health and social training amongst the project team and in the community which include HIV/AIDs and Covid awareness training.

5. Traffic Regulation

Construction and Demolition Phase:

- Rehabilitate the gravel road during and particularly after construction and decommissioning to at least the same standard as is currently.
- Upgrade road signs to address the movement conflict.
- Road signs for protecting pedestrians crossing and accessing the road should be displayed.
- Provide transport to decrease pedestrian traffic.
- Restrict heavy vehicles to specific hours.
- Erect road signs signal times when heavy vehicles will make use of the road.

Construction

- Adhere to national traffic safety standards and precaution measures.
- Contractor/ Implementation agent to provide a traffic safety awareness programme amongst the project team and the community, particularly the kids

6. Dust and Noise control

Construction and Demolition Phases:

- Dust creation must be controlled as per construction and demolition management and control code.
- Noise creation should be controlled as per construction and demolition management and control code.
- Appoint an Environmental Control Officer to supervise construction and building and demolition.
- Adhere to the Environmental Management Plan (EMPr) for the Construction and Decommissioning Phase.
- All workers and management must undergo an induction course.
- Any natural habitat destroyed by constructing infrastructure should be rehabilitated.
- Enforce strict operating hours for heavy vehicles and construction activities on site to reduce noise and dust impacts on adjacent landowners.
- Implementation dust suppression measures;
- Access must be on recognized routes.
- Litter and littering must be strictly controlled.
- All construction waste and building rubble and demolition waste and rubble must be removed off site.

7. Enhancing the economy

Construction, Operations and Demolition Phases:

- Contractors should be directed by tender criteria to purchase locally and to make use of local service providers.
- Spending money locally purchasing from locals and South African should benefit employees. The proposed development should leverage discount in the local economy of the municipal area and employees should be made aware of it.
- Small business should be supported (i.e., skills training, assistance and guidance to set up small businesses) and joint ventures with previous disadvantaged persons should be promoted.

- The promotion of joint ventures between small business (owned by previous disadvantaged persons) and more established business should be encouraged.

Operational Phase:

- Market the solar and hydrogen facility as a tourist destination.
- Create links with other tourism activities in Vanrhynsdorp through a website and the local tourism office.
- The promotion of joint ventures between small business (owned by previous disadvantaged persons) and more established business.
- Implement formal small business training and mentoring programmes.
- Ensure the compilation of a management plan (EMPr)

8. Maintenance of Sense of place:

Design and Planning Phases:

- Prepare an Environmental Constraints Plan to establish the environmental sensitive areas and those areas upon which the development may occur.
- Design buildings to reflect the local architecture and sense of place of the environment. Buildings and similar structures must be in keeping with regional planning policy documents, especially the principles of critical regionalism, namely sense of place, sense of history, sense of nature, sense of craft and sense of limits.
- Should it be required, install anti-reflective coating or glass to reduce the sunlight that is reflected and increase the amount of sunlight that is absorbed.
- Consider installing all electrical cables underground enroute to the substation.
- Where cables cannot be laid underground and electricity towers (pylons) need to be erected, install H-frame wooden poles, or similar structures, to transmit electrical lines instead of steel towers.

Construction and Operational Phases:

- An Environmental Control Officer (ECO) must be appointed to oversee the construction process and ensure compliance with conditions of approval.
- Contractor to sign and undertake to comply with Environmental Specifications
- Demarcate sensitive areas and no-go areas with danger tape to prevent disturbance during construction.

- Pre-construction keep disturbed areas to a minimum. No clearing of land to take place outside the demarcated footprint. Keep disturbed areas to a minimum.
- Throughout construction, identify suitable areas within the construction site for fuel storage, temporary workshops, eating areas, ablution facilities and washing areas.
- Throughout construction institute a solid waste management programme to minimize waste generated on the construction site and recycle where possible.
- Throughout construction reduce and control dust using approved dust suspension techniques as and when required.
- Construction to occur only during daytime. Should the ECO authorize night work, low flux and frequency lighting shall be used.
- Throughout construction, rehabilitate all disturbed areas in accordance with the development plan. Clear all alien vegetation.
- A photographic record of the site and its immediate surrounding area must be kept as part of the EMPr to serve as a baseline for measurement of all future visual impacts and as an aid to the full rehabilitation of the site should the facility be decommissioned in future.
- Excavation on the site is to be kept to the absolute minimum required for the successful implementation of the project.
- Outdoor lighting must be strictly controlled so as to prevent light pollution: Any necessary lighting must be shielded in such a way (such as trees and buildings or structures) that no direct light is allowed to escape into the surrounding terrain or up into the sky (All lighting must be installed at downward angles). Only the areas that are necessary to be lit must be lit with the surrounding. Use only minimum wattage light fixtures, such as trees and buildings or structures
- Utilize existing roads and tracks to the maximum extent possible.
- Provide where practical, pedestrian walkways where desire lines are identified.
- Visual management and maintenance: Scheme maintenance covering site tidiness should be maintained at all times including during construction.
- Buildings and similar structures must be in keeping with regional planning policy documents, especially the principles of critical regionalism, namely sense of place, sense of history, sense of nature, sense of craft and sense of limits.

Operational Phases:

Apply the following urban design indicators and guidelines:

- Maintain the general appearance of the facility as a whole (i.e., the PV panels, buildings and associated infrastructure, roads and natural environment).

- Littering is to be strictly controlled over the entire life of the project
- All waste is to be regularly removed from facility to a recognized dumping site. Waste, in any form, should not be allowed to collect on the site.
- Visual management and maintenance: Scheme maintenance covering site tidiness should be maintained at all times including during construction.
- Monitor land surface below PV 'strings' to prevent loss of vegetation and first signs of desertification.
 - The use of any cleaning materials or defoliants to aid in the control of vegetation is to be strictly monitored so that their long-term use does not cause future problems should the site be decommissioned.
- Maintain access roads to prevent scouring and erosion, especially after rains.
 - Utilize existing roads and tracks to the maximum extent possible.
 - Provide pedestrian walkways where desire lines are identified.
- Monitor the use of lighting over the entire life of the project to minimize light pollution.
 - Strictly control outdoor lighting to prevent light pollution.
 - All lighting must be installed at downward angles.
 - Sources of light must as far as possible be shielded by physical barriers such as a planted trees and shrubs or built structures. Plant a screen of endemic bushes and trees together with fencing in natural colour and good plant maintenance. (Interface integration of proposed solar and hydrogen facility with surroundings).
 - Consider the application of motion detectors to allow the application of lighting only where and when it is required.
 - Only minimum wattage light fixtures must be used.
- A strict fire prevention policy must be implemented and monitored.

Decommission phase

- Prepare a decommissioning plan to establish a timeframe and order of decommissioning and rehabilitation of the plant.
- During demolition the site should be returned to as near as its existing state as is possible.
- All waste material has to be removed.
 - Removal of all infrastructure introduced into the landscape (i.e., PV panels, ancillary infrastructure such as a maintenance workshop, storage building and offices).
 - Rehabilitate all new access roads created during the construction period.
 - Institute monitoring of all decommissioned and rehabilitated sections of the project site at regular intervals.

9. Protect Agricultural Potential and Water Sources

Construction Phase:

The site should be developed with as little disturbance as possible to be able to rehabilitate it back to its natural form.

- Control vehicle access and constructional activity on roads and minimal footprint areas only.
- Strip and stockpile topsoil from all areas where soil will be disturbed. After cessation of disturbance, re-spread topsoil over the surface.
- Dispose of any sub-surface, clay spoils from excavations where they will not impact on vegetated land, or where they can be effectively covered with topsoil.

Operational Phase:

- Implement an effective system of storm water run-off control at any point where run-off water might accumulate. The system must effectively collect and safely disseminate any run-off water from all accumulation points and it must prevent any potential down slope erosion.
- Any occurrences of erosion must be attended to immediately and the integrity of the erosion control system at that point must be amended to prevent further erosion from occurring there.
- Maintain where possible all vegetation cover and facilitate re-vegetation of uncovered areas throughout the site, to stabilize disturbed soil against erosion, and to reduce dust formation.
- If an activity will mechanically disturb the soil below surface in any way, then any available topsoil should first be stripped from the entire surface to be disturbed and stockpiled for re-spreading during rehabilitation. During rehabilitation, the stockpiled topsoil must be evenly spread over the entire disturbed surface, and then stabilized by facilitating vegetation cover.
- Enhance on-site conservation where appropriate.

Construction, Operation and Decommission Phases

- Implement an effective system of run-off control which collects and disseminates run-off water from hardened surfaces and prevents potential down slope erosion (all phases).

10. Maintaining Social Benefits

Decommissioning Phase:

- The social benefit fund should explore partnership and other sources of funding.

- Some funds should be invested as a source for future support to local children.

11. Mitigate Retrenchments

Decommissioning Phase:

- During the contract period, provision should be made for those employed to obtain additional skills set.
- Effort should be made to obtain placement for contract workers in either their current or their alternative field of expertise.
- The developer should establish a fund from which these contractors could benefit.
- The established Monitoring Committee for the construction and demolition phases in collaboration with representatives of the local community, has to ensure that the EMP is implemented and the solar and hydrogen facility is decommissioned and that any problems that arise and is associated with the decommissioning phase, is addressed.

10.7.4 CONCLUSION

The above management guidelines have been presented in terms of the specific social constraints that might result due to the proposed Solar and hydrogen Facility and related infrastructure. These guidelines aim to change the social constraints of the proposed development into benefits in favour of the local community of Vanrhynsdorp and the inhabitants of Matzikama Municipality.

8.7 CUMULATIVE IMPACTS OF THE PROPOSED AMENDMENT

Cumulative impacts, as defined by the NEMA EIA Regulations (as amended 2017), as follows; *“in relation to an activity, means the past, current and reasonably foreseeable future impact of an activity, considered together with the impact of activities associated with that activity, that in itself may not be significant, but may become significant when added to the existing and reasonably foreseeable impacts eventuating from similar or diverse activities”*.

Cumulative impacts for this project were calculated taking into account the small size of the proposed development and the impact of similar developments within a 30km radius (Figure 14).

According to the terrestrial biodiversity compliance statement (**Appendix 4A**), the proposed Vanrhynsdorp solar and hydrogen plant will be relatively small (<20ha) and will impact only one vegetation type, namely Vanrhynsdorp Gannabosveld. Vanrhynsdorp Gannabosveld vegetation type is not considered vulnerable or threatened with more 79% still remaining in its natural state. Because of its small size, the proposed footprint is unlikely to have any significant impact on connectivity within the ecological support area. Floristically, no protected plant species or red-listed plant species were

encountered. In the case of the Vanrhynsdorp Solar site, two other renewable energy sites, within 30km, may impact on the same vegetation type. Both sites are relatively small (10 MW & 20 MW), which should relate to approximately 30 ha in total. Together with the Vanrhynsdorp Solar site it relates to approximately a 40-50 ha impact on this vegetation type out of roughly 540 700 ha (of which almost 79% are still believed to be fairly natural). The impact of the Vanrhynsdorp solar site is thus roughly 0.0018%, while the cumulative impact is roughly 0.0092%.

The cumulative loss of agricultural land has a low impact as low potential agricultural soils that can only be used for grazing were selected for the different sites. The loss for agriculture relates to loss of grazing capacity which is not significant.

According to the Visual Impact Assessment (**Appendix 4D**), The cumulative impact of the proposed amendment is low due to the small footprint as well as similar small footprint of adjacent approved project.

The cumulative impact through environmental degradation, loss of habitat and disturbance to terrestrial biodiversity is expected to be Low (negative) after mitigation. The overall cumulative impact is expected to be Low Negative.

9. SUMMARY OF IMPACTS

Table 9 and 10 is a summary of all the impacts assessed in the specialists reports that are associated with the proposed amendment.

Table 10: Summary of all impacts during the construction and operational phase

Study	Impact	Significance No Mitigation	Significance With Mitigation
Terrestrial (Botanical)	Loss of Vanrhynsdorp Gannabosveld (Construction)	Low (Negative impact)	Low (Negative impact)
	Loss of Vanrhynsdorp Gannabosveld (Operation)	Very Low (Negative impact)	Very Low (Negative impact)
Terrestrial (Fauna and avifauna)	No significant species were observed on the larger farm during any of the site visits.	Very Low (Negative impact)	Very Low (Negative impact)
	Cumulative Impact	Low (Negative impact)	Low (Negative impact)
Heritage	No further impact assessment required for the proposed amendment	N/A	N/A
Palaeontology	No further impact assessment required for the proposed amendment	N/A	N/A
Soil and Agricultural Potential	No further impact assessment required for the proposed amendment. Site has low agricultural potential.	N/A	N/A
Visual	Changes to the surrounding visual character and sense of place	Low (Negative impact)	Low (Negative impact)
	Cumulative Impact	Low (Negative impact)	Low (Negative impact)
Socio-	Temporary increase in the local population	Low	Low

economic	numbers (construction)	(Negative impact)	(Negative impact)
	Employment generation (construction)	Low (Positive impact)	Medium (Positive Impact)
	Employment generation (operations)	Medium (Positive Impact)	High (Positive Impact)
	Increased household income (construction)	Low (Positive impact)	Medium (Positive Impact)
	Increased household income (operational)	Low (Positive impact)	Medium (Positive Impact)
	Skills development, training and capacity building are offered (construction)	Low (Positive impact)	Low (Positive impact)
	Skills development, training and capacity building are offered (operational)	Medium (Positive Impact)	High (Positive Impact)
	Improved Local Economy (GDP) and Increased Sales (construction)	Low (Positive impact)	Low (Positive impact)
	Improved Local Economy (GDP) and Increased Sales (operational)	Medium (Positive Impact)	Medium (Positive Impact)
	Proximate work locations (operational)	Medium (Positive Impact)	Medium (Positive Impact)
	Broadened municipal basis (operational)	Medium (Positive Impact)	Medium (Positive Impact)
	Enhanced supply of Bulk Services (operational)	Medium (Positive Impact)	High (Positive Impact)
	Increased levels of education (Individual development) (operational)	Medium (Positive Impact)	Medium (Positive Impact)
	Increased SMME participation (operational)	Low (Positive impact)	Medium (Positive Impact)

	Increased Use of Social Amenities & Service (construction)	Low (Negative impact)	Very low (Negative impact)
	Increased traffic levels (construction)	Low (Negative impact)	Low (Negative impact)
	Increased noise & levels (construction)	Low (Negative impact)	Very low (Negative impact)
	Change in sense of place (construction)	Low (Negative impact)	Low (Negative impact)
	Change in sense of place (operational)	Medium (Negative impact)	Low (Negative impact)
	Community stability & homogeneity (construction)	Low (Negative impact)	Low (Negative impact)
	Crime and Offences (construction)	Low (Negative impact)	Very low (Negative impact)
	Youth's self-esteem (construction)	Low (Positive impact)	Medium (Positive Impact)
	Self-esteem and image of Youth and women (operational)	Low (Positive impact)	Medium (Positive Impact)
	Employment equity of vulnerable Groups (operational)	Low (Positive impact)	Medium (Positive Impact)
	Growth in Business Tourism (operational)	Low (Positive impact)	Medium (Positive Impact)

Table 11: Summary of all impacts during the construction and operational phase

	Employment generation (operations)	Low (Positive impact)	Low (Positive impact)
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	Increased household income (construction)	Low (Positive impact)	Low (Positive impact)
	Skills development of working age population	Low (Positive impact)	Low (Positive impact)
	Improved Local Economy (GDP) and Increased Sales (operational)	Low (Positive impact)	Low (Positive impact)

10. RECOMMENDATIONS

The following mitigation measures are recommended by the EAP:

- A suitably qualified Environmental Control Officer must be appointed to monitor the construction phase in terms of the EA and the construction phase EMP and any other conditions pertaining to specialist studies.
- Before any work is done the development footprint and access routes must be clearly demarcated and approved by the ECO. The demarcation must include the total footprint necessary to execute the work, but must aim at minimum disturbance.
- Indiscriminate clearing of any area outside of the construction footprint must be avoided.
- Any areas impacted as a result of construction outside of the development footprint must be rehabilitated on completion of the project.
 - This includes the removal of all excavated material, spoil and rocks, all construction related material and all waste material.
 - It also included replacing the topsoil back on top of the excavation as well as shaping the area to represent the original shape of the environment.
- An integrated waste management approach must be implemented during construction.
 - Construction related general and hazardous waste may only be disposed of at Municipal approved waste disposal sites.
 - All rubble and rubbish should be collected and removed from the site to a suitable registered waste disposal site.
- Special attention must be given to alien and invasive control within the construction footprint.
 - Care must be taken with the eradication method to ensure that the removal does not impact or lead to additional impacts (e.g. spreading of the Alien Invasive Plants due to incorrect eradication methods);
 - Care must be taken to dispose of alien plant material responsibly.

The mitigation measures come down to good management, vigilance and foresight. Measures are readily implementable and stand a good chance of being successful.

11. CONCLUSIONS

The following specialist studies were undertaken as part of this Environmental Impact Assessment:

- ❖ Terrestrial Impact Assessment
- ❖ Heritage Impact Assessment
- ❖ Soil and Agricultural Potential Assessment
- ❖ Visual Impact Assessment
- ❖ Socio-economic Impact Assessment

The specialist studies and the information provided within the EIA Report, indicates that the proposed Solar PV and Hydrogen Facility amendment does not pose any significant impacts and can be implemented with appropriate mitigation.

In terms of the need and desirability, the National Development Plan 2030 (NDP) envisages that, by 2030, South Africa will have an energy sector that promotes:

1. *“Economic growth and development through adequate investment in energy infrastructure. The sector should provide reliable and efficient energy service at competitive rates, while supporting economic growth through job creation”* (p.163)

Solar and hydro-energy is one of the most, if not the most efficient ways to produce energy as it does not require fossil fuels / any non-renewable energy resources such as coal, oil or natural gas. The development will lead to the creation of 30 job opportunities in a period of 6 – 8 months, thus supporting economic growth through job creation.

2. *“Social equity through expanded access to energy at affordable tariffs, and through targeted sustainable subsidies for needy households.”* p.163

In the past years ESKOM has not been able to keep up its energy production (making use of non-renewable energy sources) to supply the need of the ever expanding urban settlements. This has led to our country experiencing load shedding. The first case of load shedding dates back to 2007 and has since worsened. The need for electricity in essence exceeds the current supply. The establishment of the solar farm will lead to an increase availability of electricity, alleviating demand from the National Grid.

3. *“Environmental sustainability through efforts to reduce pollution and mitigate the effects of climate change”.* p163

Renewable energy resources such as solar, wind or hydro power are energy derived from natural resources and are replenished at a higher rate than they are consumed. This not only makes it a limitless source of potential energy production, but also creates far lower emissions than burning fossil fuels. The NDP further states that the energy system will change over the next 20 years, where gas and renewable energy resources will play a much larger role while using proportionally less coal.

The NDP aims to achieve these goals by the 2030, thus the development of renewable energy facilities should be promoted.

The proposed site is also ideally located, in that it is:

- Parts of the property have been disturbed by current and past agricultural activities, mostly livestock grazing.
- The topography is also ideal, as the property is generally flat, with very little gradient.
- The general area is also ideally suited for a solar PV facility due to the relatively high irradiation levels.
- There are no significant physical characteristics of the property or environmental constraints which would exclude the site from development.

The low level of sensitivity of the receiving environment from a terrestrial biodiversity perspective, indicates that the proposed amendment of the Roma Energy Solar Plant are suited to the purpose and the project is supported. The NID identified that no additional HIA is required for the proposed amendment. It was confirmed that the proposed amendment will not induce any additional impacts on the Soil, Land-use and Agricultural Potential of the site that was not assessed in the 2017 study. The 2017 Soil, Land-use and Agricultural Potential Survey concluded that the site has low agricultural potential with limited rainfall and can primarily only be used for grazing.

The visual impact Associated with the proposed amendment is restricted to a small view catchment with very few potential receptors within the viewshed. The overall impact on these receptors are also low and therefore the visual impact can be regarded as low to insignificant. The construction impact would be temporary and not significant.

From a socio-economic perspective, the positive impacts of the proposed solar facility will benefit the broader community whilst the negative impacts affect only some individuals or households. The proposed solar facility is deemed acceptable as it is:

- During the construction phase, the generation of 30 jobs and a wage bill of R3.4 million over 6 months and R3 million benefitting the 27 locals, providing 15 unskilled, 10 semi-skilled and 2 skilled people employment.
- During the operational phase, will generate 3 jobs, and a wage bill of R14 million for the first ten years of which R13 million will benefit locals and R1 million per annum is spend.
- Generating work within relatively close proximity (± 1 km) during all phases of the solar and hydrogen facility's lifetime.
- Contribute to skills and educational levels of the local community.

As the positive impacts are more beneficial to the broader community, the proposed solar facility is recommended from a socio-economic perspective.

Considering all the information, it is not envisaged that this proposed Roma Energy Solar PV and Hydrogen facility amendment will have a significant negative impact on the environment, and the socio-economic benefits are expected to greatly outweigh any negative impacts.

It is therefore recommended that the proposed Roma Energy Solar PV and Hydrogen facility amendment be supported and be authorised with the necessary conditions of approval.

12. DETAILS AND EXPERTISE OF THE EAP

Details of Environmental Assessment Practitioner, expertise and Curriculum Vitae

This Draft Environmental Impact Report was prepared by Jan-Taljaard Marx (EAPASA Registration: 2021/3289) who has a MSc. Degree in Botany and BSc Degree in Conservation Ecology. He has been working as an Environmental Assessment Practitioner since 2019 and is currently employed at EnviroAfrica CC.

Qualifications:

- BSc. Conservation Ecology and;
- MSc. Botany, all from the University of Stellenbosch.

Expertise:

Jan-Taljaard Marx has 4 years' experience in the environmental management field as an Environmental Assessment Practitioner and as an Environmental Control Officer, having worked on a variety of projects across South Africa.

Employment:

Previous employment as an EAP: Exalon III (2019 – 2022)

Current employment: EnviroAfrica cc (2022 – present).

The whole process and report was supervised by Bernard de Witt who has more than 25 years' experience in environmental management and environmental impact assessments.

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