PROPOSED KENHARDT PV FACILITIES: NEW ACCESS ROAD, NORTHERN CAPE PROVINCE

TRAFFIC IMPACT STUDY

DECEMBER 2020
First Issue

Prepared by:

JG AFRIKA (PTY) LTD

Branch: Cape Town
PO Box 38561
Postal code: 7430
Telephone: 021 530 1800
Email: wink@ jgafrika.com

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CARRIED OUT BY:	**COMMISSIONED BY:**
JG AFRIKA (PTY) LTD **Cape Town** PO Box 38651 Pinelands 7430 Tel.: 021 530 1800 Email: Wink@jgafrika.com	**Scatec Solar South Africa (Pty) Ltd.** 2nd Floor North Wing, 3 Dock Road Waterway House, V&A Waterfront Cape Town, 8001 Tel: + 27 (21) 202 1230 Email: Sonia.miszczak@scatecsolar.com
AUTHOR Iris Wink	**CLIENT CONTACT PERSON** Sonia Miszczak

SYNOPSIS

Preparation of a Traffic Impact Study for the proposed new access road for the Kenhardt PV Facilities located in the Northern Cape Province, pertaining to all relevant traffic and transportation engineering aspects.

KEY WORDS:

Solar Energy Facility, Traffic Impact Study

QUALITY VERIFICATION

This report has been prepared under the controls established by a quality management system that meets the requirements of ISO 9001: 2015 which has been independently certified by DEKRA Certification.

Verification	Capacity	Name	Signature	Date
By Author	Associate	I Wink		27/11/2020
Checked by:	Senior Technologist	A Johnson		27/11/2020
Authorised by:	Director	H Tiganis		27/11/2020

Filename:	5479 – Kenhardt PV_Access Road JG AFRIKA

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SPECIALIST EXPERTISE

IRIS SIGRID WINK

Profession	Civil Engineer (Traffic & Transportation)
Position in Firm	Associate
Area of Specialisation	Manager: Traffic & Transportation Engineering
Qualifications	PrEng, MSc Eng (Civil & Transportation)
Years of Experience	18 Years
Years with Firm	8 Years

SUMMARY OF EXPERIENCE

Iris is a Professional Engineer registered with ECSA (20110156). She joined JG Afrika (Pty) Ltd. in 2012. Iris obtained a Master of Science degree in Civil Engineering in Germany and has more than 15 years of experience in a wide field of traffic and transport engineering projects. Iris left Germany in 2003 and has worked as a traffic and transport engineer in South Africa and Germany. She has technical and professional skills in traffic impact studies, public transport planning, non- motorised transport planning and design, design and development of transport systems, project planning and implementation for residential, commercial and industrial projects and providing conceptual designs for the abovementioned. She has also been involved with transport assessments for renewable energy projects and road safety audits.

PROFESSIONAL REGISTRATIONS & INSTITUTE MEMBERSHIPS

PrEng -Registered with the Engineering Council of South Africa No. 20110156
-Registered Mentor with ECSA for the Cape Town Office of JG Afrika
MSAICE -Member of the South African Institution of Civil Engineers
ITSSA -Member of ITS SA (Intelligent Transport Systems South Africa)
SAWEA -Member of the South African Wind Energy Association
SARF -South African Road Federation: Committee Member of Council
SARF WR - SARF Western Region Committee Member
SARF RSC - Road Safety Committee Member
IRF **- Global Road Safety Audit Team Leader with the International Road Federation (IRF)**

EDUCATION

1996 - Matric – Matric (Abitur) – Carl Friedrich Gauss Schule, Hemmingen, Germany
1998 - Diploma as Draughtsperson – Lower Saxonian State Office for Road and Bridge Engineering
2003 - MSc Eng (Civil and Transportation) – Leibniz Technical University of Hanover, Germany

SPECIFIC EXPERIENCE (SELECTION)

JG Afrika (Pty) Ltd (Previously Jeffares & Green (Pty) Ltd)
2016 – Date
Position – Associate

- **Rondekop Windfarm** – Transport study for the proposed Kudusberg Windfarm near Sutherland, Northern Cape – Client: G7 Renewable Energies

- **Kudusberg Windfarm** – Transport study for the proposed Kudusberg Windfarm near Sutherland, Northern Cape – Client: G7 Renewable Energies
- **Multiple Traffic Impact and Route Assessment** for the proposed Solar PV Facilities in the Northern Cape – Client: Private Developer
- **Kuruman Windfarm –** Transport study for the proposed Kuruman Windfarm in Kuruman, Northern Cape – Client: Mulilo Renewable Project Developments
- **Coega West Windfarm** – Transportation and Traffic Management Plan for the proposed Coega Windfarm in Coega, Port Elizabeth – Client: Electrawinds Coega
- **Traffic and Parking Audits** for the Suburb of Groenvallei in Cape Town – Client: City of Cape Town Department of Property Management.
- **Road Safety Audit** for the Upgrade of N1 Section 4 Monument River – Client: Aurecon on behalf of SANRAL
- **Sonop Windfarm** – Traffic Impact Assessment for the proposed Sonop Windfarm, Coega, Port Elizabeth – Client: Founders Engineering
- **Universal Windfarm** - Traffic Impact Assessment for the proposed Universal Windfarm, Coega, Port Elizabeth – Client: Founders Engineering
- **Road Safety Audit** for the Upgrade of N2 Section 8 Knysna to Wittedrift – Client: SMEC on behalf of SANRAL
- **Road Safety Audit** for the Upgrade of N1 Section 16 Zandkraal to Winburg South – Client: SMEC on behalf of SANRAL
- **Traffic and Road Safety Studies** for the Improvement of N7 Section 2 and Section 3 (Rooidraai and Piekenierskloof Pass) – Client: SANRAL
- **Road Safety Appraisal**s for Northern Region of Cape Town – Client: Aurecon on behalf of City of Cape Town (TCT)
- **Traffic Engineering Services** for the Enkanini Informal Settlement, Kayamandi - Client: Stellenbosch Municipality
- **Lead Traffic Engineer** for the Upgrade of a 150km Section of the National Route N2 from Kangela to Pongola in KwaZulu-Natal, Client: SANRAL
- **Traffic Engineering Services** for the Kosovo Informal Settlement (which is part of the Southern Corridor Upgrade Programme), Client: Western Cape Government
- **Traffic and Road Safety Studies** for the proposed Kosovo Informal Housing Development (part of the Southern Corridor Upgrade Program), Client: Western Cape Government.
- **Road Safety Audit Stage 3** – Upgrade of the R573 Section 2 between Mpumalanga/Gauteng and Mpumalanga/Limpopo, Client: AECOM on behalf of SANRAL
- **Road Safety Audit Stage 1 and 3** – Upgrade of the N2 Section 5 between Lizmore and Heidelberg, Client: Aurecon on behalf of SANRAL
- **Traffic Safety Studies** for Roads Upgrades in Cofimvaba, Eastern Cape – Client: Cofimvaba Municipality
- **Road Safety Audit Stage 1 and 3** – Improvement of Intersections between Olifantshoek and Kathu, Northern Cape, Client: Nadeson/Gibb on behalf of SANRAL
- **Road Safety Audit Stage 3** – Upgrade of the Beacon Way Intersection on the N2 at Plettenberg Bay, Client: AECOM on behalf of SANRAL

- **Traffic Impact Assessment** for a proposed Primary School at Die Bos in Strand, Somerset West, Client: Edifice Consulting Engineers
- **Road Safety Audit** Stage 1 and 3 – Improvement of R75 between Port Elizabeth and Uitenhage, Eastern Cape, Client: SMEC on behalf of SANRAL

SPECIALIST DECLARATION

I, **IRIS WINK**, as the appointed independent specialist, in terms of the 2014 EIA Regulations, hereby declare that I:

- I act as the independent specialist in this application;
- I perform the work relating to the application in an objective manner, even if this results in views and findings that are not favorable to the applicant;
- Regard the information contained in this report as it relates to my specialist input/study to be true and correct, and do not have and will not have any financial interest in the undertaking of the activity, other than remuneration for work performed in terms of the NEMA, the Environmental Impact Assessment Regulations, 2014 and any specific environmental management Act;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I have no vested interest in the proposed activity proceeding;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- I have ensured that information containing all relevant facts in respect of the specialist input/study was distributed or made available to interested and affected parties and the public and that participation by interested and affected parties was facilitated in such a manner that all interested and affected parties were provided with a reasonable opportunity to participate and to provide comments on the specialist input/study;
- I have ensured that the comments of all interested and affected parties on the specialist input/study were considered, recorded and submitted to the competent authority in respect of the application;
- All the particulars furnished by me in this specialist input/study are true and correct; and
- I realise that a false declaration is an offence in terms of regulation 48 and is punishable in terms of section 24F of the Act.

Signature of the specialist: _____

Name of Specialist: IRIS WINK

Date: 27/11/2020

COMPLIANCE WITH THE APPENDIX 6 OF THE 2014 EIA REGULATIONS

Requirements of Appendix 6 – GN R326 EIA Regulations of 7 April 2017	Addressed in the Specialist Report
1. (1) A specialist report prepared in terms of these Regulations must contain- a) details of- i. the specialist who prepared the report; and ii. the expertise of that specialist to compile a specialist report including a curriculum vitae;	Yes. See attached CV
b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Yes. See attached declaration
c) an indication of the scope of, and the purpose for which, the report was prepared;	Yes.
(cA) an indication of the quality and age of base data used for the specialist report;	n/a
(cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Yes.
d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	n/a
e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Yes.
f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	n/a
g) an identification of any areas to be avoided, including buffers;	Yes.
h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	n/a
i) a description of any assumptions made and any uncertainties or gaps in knowledge;	Yes.
j) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives on the environment or activities;	Yes.
k) any mitigation measures for inclusion in the EMPr;	Yes.
l) any conditions for inclusion in the environmental authorisation;	n/a
m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	n/a
n) a reasoned opinion- i. as to whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and ii. if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	Yes.
o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	n/a
p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	n/a
q) any other information requested by the competent authority.	n/a
2) Where a government notice *gazetted* by the Minister provides for any protocol or minimum information requirement to be applied to a specialist report, the requirements as indicated in such notice will apply.	n/a

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1 INTRODUCTION AND METHODOLOGY

1.1 Scope and Objectives

This report needs to be read in conjunction with the Traffic Impact Assessment for Phase 2 of the Kenhardt PV facility (Kenhardt 4, 5 and 6) conducted by WSP in January 2020 and an additional Traffic Statement prepared by Scatec Solar in September 2020.

The Kenhardt PV project consists of six PV facilities to be located on the Remaining extent of Onder Rugzeer Farm 168, located north-east of Kenhardt in the Northern Cape (see **Figure 1.1**). Phase 1 (referred to as Kenhardt 1, 2 and 3) received Environmental Authorisation in 2017. Scatec Solar South Africa (Pty) Ltd. then proposed to develop Phase 2 (referred to as Kenhardt 4, 5 and 6), which was authorised in August 2020. The Basic Assessment process is to provide for an integrated access road that will be able to provide access to all six projects.

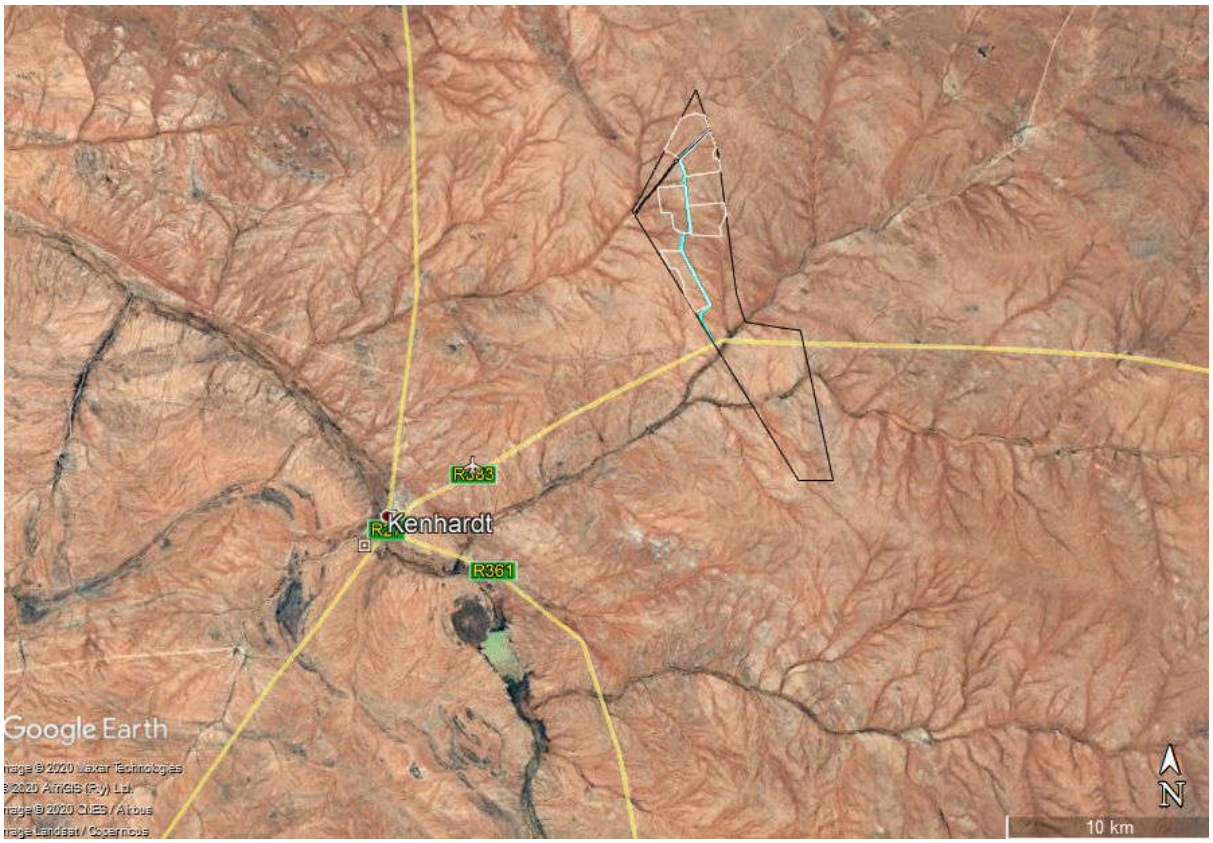

Figure 1.1: Site Location

During the application process it was found that the two access points (Option A and B - shown in **Figure 1.2**) initially assessed are not suitable (which will further be discussed in this report) and that a separate

basic assessment process is required to address a proposed new access point from the R383 (Option C) to service the six PV facilities. This report will focus on this new access point.

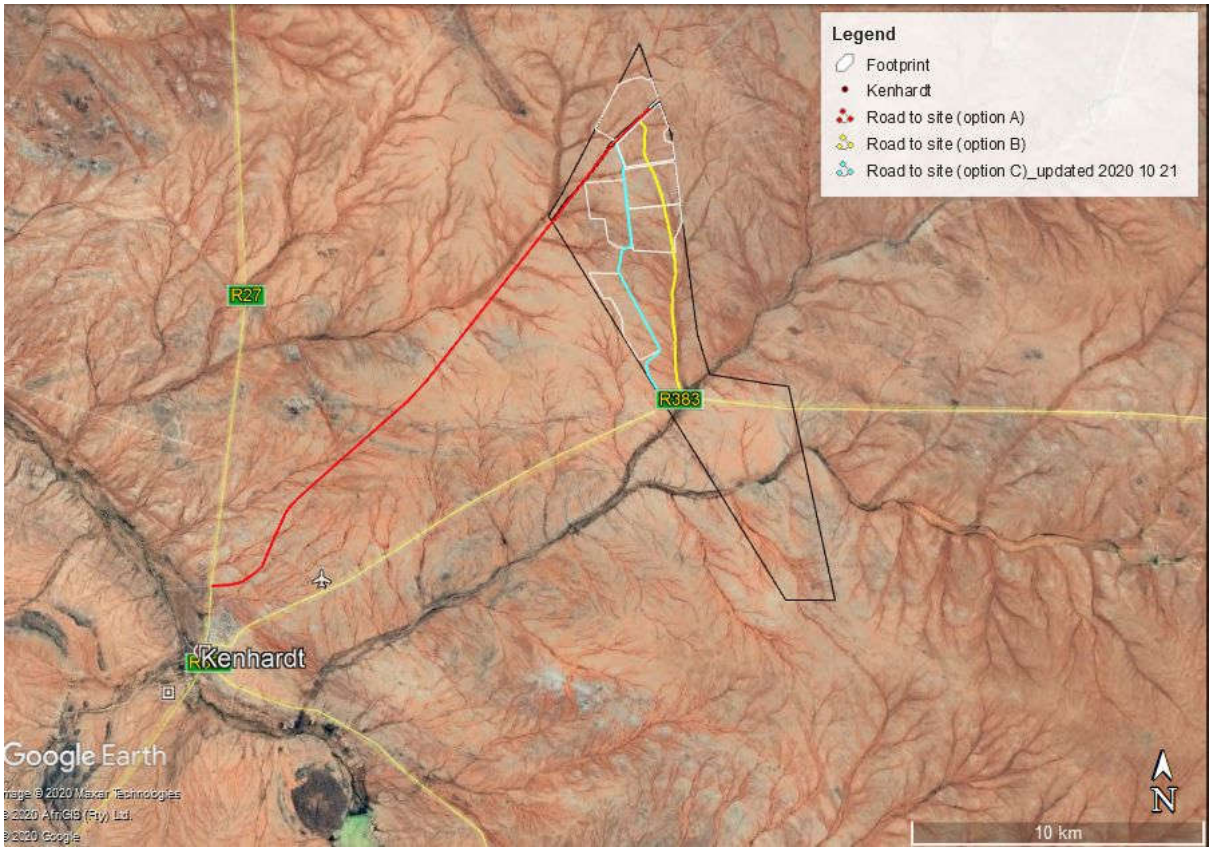

Figure 1.2: Proposed initial and new access roads

The following two transportation activities need to still be addressed:

- Abnormal load vehicles transporting components to the site.
- The transportation of construction materials, equipment and people to and from the site/facility.

The transport study will aim to provide the following objectives:

- Assess activities related to traffic movement for the construction and operation (maintenance) phases of the facility.
- Assess the proposed new access point Option C from a traffic movement and road safety perspective.

This Traffic Impact Assessment includes the following:

- Extent of the transport study and study area;
- The proposed development;
- Trip generation for the facility during construction and operation;
- Traffic impact on external road network;
- High-level input into accessibility requirements; and
- Assessment of freight requirements and permitting needed for abnormal loads.

This transport study was informed by the following:

Project Assessment

- Overview of project background information including location maps, component specs, previous studies and any possible resulting abnormal loads to be transported; and
- Research of all available documentation and information relevant to the proposed project.

This report considered and assessed the following:

Traffic Assessment

- Estimation of trip generation;
- Discussion on potential traffic impacts; and
- Construction and operational (maintenance) vehicle trips.

Access Points

- Assessment of the proposed access points Option A and B; and
- Assessment of the proposed new access point Option C.

1.2 Assumptions and Limitations

The following assumptions and limitations apply when conducting Traffic studies for renewable energy projects:

- This study is based on the project information provided by Scatec Solar and Cape EAPrac;
- According to the Eskom Specifications for Power Transformers (Eskom Power Series, Volume 5: Theory, Design, Maintenance and Life Management of Power Transformers), the following dimensional limitations need to be kept when transporting the transformer – total maximum height 5 000mm, total maximum width 4 300mm and total maximum length 10 500mm;
- Maximum vertical height clearances along the haulage route is 5.2m for abnormal loads;
- Imported elements will be transported from the most feasible port of entry, which is deemed to be the Port of Saldanha in the Western Cape;
- If any elements are manufactured within South Africa, these will be transported from their respective manufacturing centers, which would be either in the greater Johannesburg, Pinetown/Durban or Cape Town for the transformer, inverter and the support structures.
- All haulage trips will occur on either surfaced national and provincial roads or existing gravel roads; and
- Material for the construction of internal access roads will be sourced locally as far as possible.

1.3 Source of Information

Information used in a transport study includes:

- Project Information provided by Scatec Solar and Cape EAPrac;
- Google Earth.kmz provided by Scatec Solar and Cape EAPrac;
- Google Earth Satellite Imagery;
- WSP Traffic Impact Assessment, January 2020;
- Traffic Statement, September 2020;
- Imagery provided by Scatec Solar; and
- Project research of all available information.

2 DESCRIPTION OF PROJECT ASPECTS RELEVANT TO THE TRANSPORT STUDY

2.1 Transportation requirements

It is anticipated that the following vehicles will access the site during construction:

- Conventional trucks within the freight limitations to transport building material to the site;
- 40ft container trucks transporting solar panels, frames and the inverter, which are within freight limitations;
- Flatbed trucks transporting the solar panels and frames, which are within the freight limitations;
- Light Differential Vehicle (LDV) type vehicles transporting workers from surrounding areas to site;
- Drilling machines and other required construction machinery being transported by conventional trucks or via self-drive to site; and
- The transformers will be transported as abnormal loads.

2.2 Abnormal Load Considerations

It is expected that the transformers will be transported with an abnormal load vehicle. Abnormal permits are required for vehicles exceeding the following permissible maximum dimensions on road freight transport in terms of the Road Safety Act (Act No. 93 of 1996) and the National Road Traffic Regulations, 2000:

- Length: 22m for an interlink, 18.5m for truck and trailer and 13.5m for a single unit truck
- Width: 2.6m
- Height: 4.3m measured from the ground. Possible height of load – 2.7m.
- Weight: Gross vehicle mass of 56t resulting in a payload of approximately 30t
- Axle unit limitations: 18t for dual and 24t for triple-axle units
- Axle load limitation: 7.7t on the front axle and 9t on the single or rear axles

Any dimension / mass outside the above will be classified as an Abnormal Load and will necessitate an application to the Department of Transport and Public Works for a permit that will give authorisation for the conveyance of said load. A permit is required for each Province that the haulage route traverses.

2.3 Further Guideline Documentation

The Technical Recommendations for Highways (TRH 11): “Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads” outlines the rules and conditions that apply to the transport of abnormal loads and vehicles on public roads and the detailed procedures to be followed in applying for exemption permits are described and discussed. Legal axle load limits and the restrictions imposed on abnormally heavy loads are discussed in relation to the damaging effect on road pavements, bridges and culverts.

The general conditions, limitations and escort requirements for abnormally dimensioned loads and vehicles are also discussed and reference is made to speed restrictions, power / mass ratio, mass distribution and general operating conditions for abnormal loads and vehicles. Provision is also made for the granting of permits for all other exemptions from the requirements of the Road Traffic Act and the relevant regulations.

2.4 Permitting – General Rules

The limits recommended in TRH 11 are intended to serve as a guide to the Permit Issuing Authorities. It must be noted that each Administration has the right to refuse a permit application or to modify the conditions under which a permit is granted. It is understood that:

a) A permit is issued at the sole discretion of the Issuing Authority. The permit may be refused because of the condition of the road, the culverts and bridges, the nature of other traffic on the road, abnormally heavy traffic during certain periods or for any other reason.
b) A permit can be withdrawn if the vehicle upon inspection is found in any way not fit to be operated.
c) During certain periods, such as school holidays or long weekends an embargo may be placed on the issuing or permits. Embargo lists are compiled annually and are obtainable from the Issuing Authorities.

2.5 Load Limitations

The maximum load that a road vehicle or combination of vehicles will be allowed to carry legally under permit on a public road is limited by:

- the capacity of the vehicles as rated by the manufacturer;
- the load which may be carried by the tyres;
- the damaging effect on pavements;
- the structural capacity on bridges and culverts;
- the power of the prime mover(s);
- the load imposed by the driving axles; and
- the load imposed by the steering axles.

2.6 Dimensional Limitations

A load of abnormal dimensions may cause an obstruction and danger to other traffic. For this reason, all loads must, as far as possible, conform to the legal dimensions. Permits will only be considered for indivisible loads, i.e. loads that cannot, without disproportionate effort, expense or risk of damage, be divided into two or more loads for the purpose of transport on public roads. For each of the characteristics below there is a legally permissible limit and what is allowed under permit:

- Width;
- Height;
- Length;
- Front Overhang;
- Rear Overhang;
- Front Load Projection;
- Rear Load Projection;
- Wheelbase;
- Turning Radius; and
- Stability of Loaded Vehicles.

2.7 Transporting Other Plant, Material and Equipment

In addition to transporting the specialised equipment, the normal Civil Engineering construction materials, plant and equipment will need to be transported to the site (e.g. sand, stone, cement, gravel,

water, compaction equipment, concrete mixers, etc.). Other components, such as electrical cables, pylons and substation transformers, will also be transported to site during construction. The transport of these items will generally be conducted with normal heavy loads vehicles, except for the transformers which require an abnormal load vehicle.

3 DESCRIPTION OF THE AFFECTED ENVIRONMENT

3.1 Description of the site

The project sites (see **Figure 3.1**) have an extent of approximately 250 ha each and will accommodate the six Kenhardt PV facilities 1 to 6, as described in Chapter 1, respectively. The project site is located on the following farm portion:

- Remaining Extent of Onder Rugzeer Farm No 168.

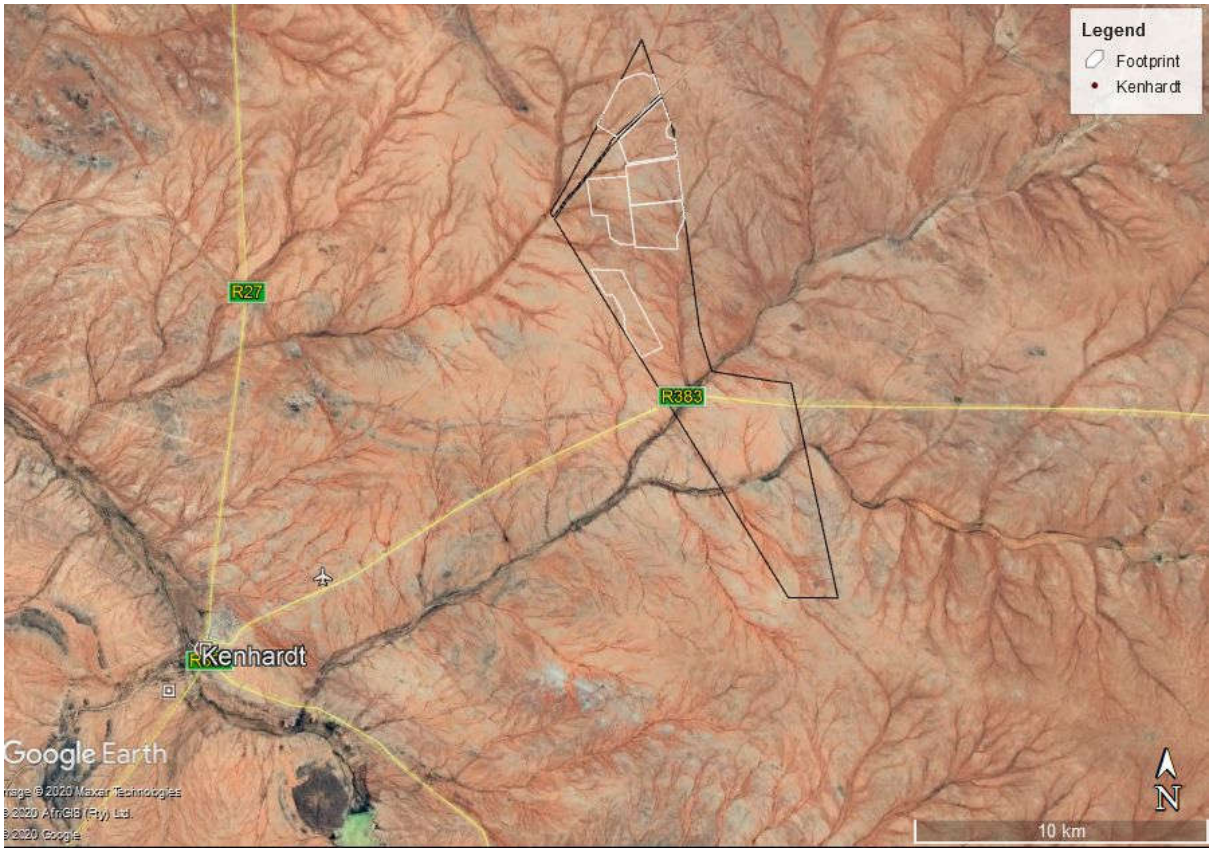

Figure 3.1: Aerial View of Proposed Kenhardt PV

It is expected that the project will consist of the following structures:

- On-site switching-station / substation;
- Auxiliary buildings (gatehouse and security, control center, office, warehouse, canteen & visitors centre, staff lockers etc.);
- Inverter-stations, transformers and internal electrical reticulation (underground cabling);
- Access and internal road network;
- Laydown area;
- Connecting to the closest substation;
- Rainwater tanks;
- Battery Energy Storage System (BESS) of up to 6ha; and
- Perimeter fencing and security infrastructure.

3.2 New main access road to the Proposed Development

In the Traffic Impact Assessment by WSP, two access roads were assessed – namely Option A and B (shown in **Figure 3.2**). These access roads have since been found unsuitable due to:

- Option A (shown in red in **Figure 3.2**), which is an existing Transnet road, is very long and Transnet would ask for significant maintenance measures from the developer.
- Option B (shown in yellow in **Figure 3.2** - an existing farm road from the R383) would need to be widened and surfaced, which triggers Section 21 of NWA as it crosses major drainage features. Furthermore, sight lines in an eastern direction are limited.

Consequently, a third access Option C (shown in cyan in **Figure 3.2**) has been suggested as the main access point for the six PV facilities (see **Figure 3.3;** pic taken in panoramic view from west to east).

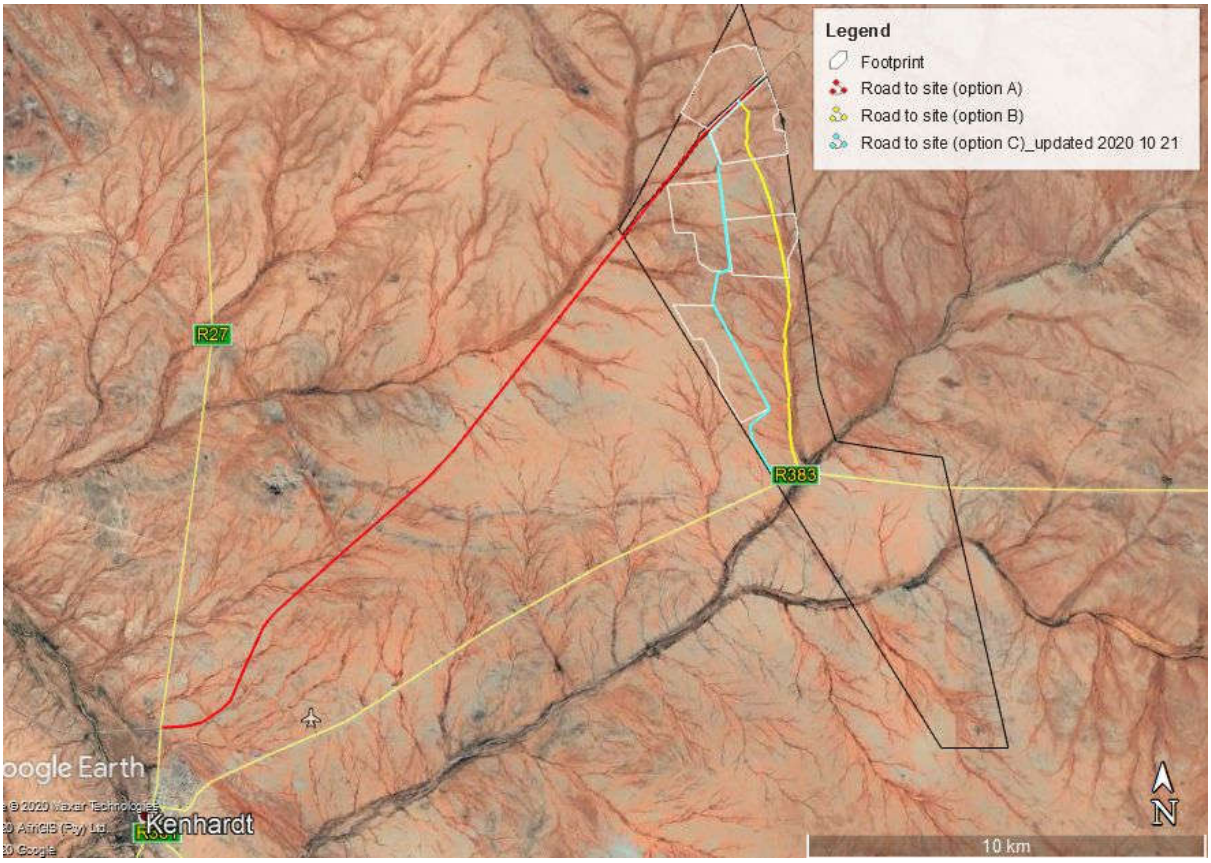

Figure 3.2: Main Access Road to the Development

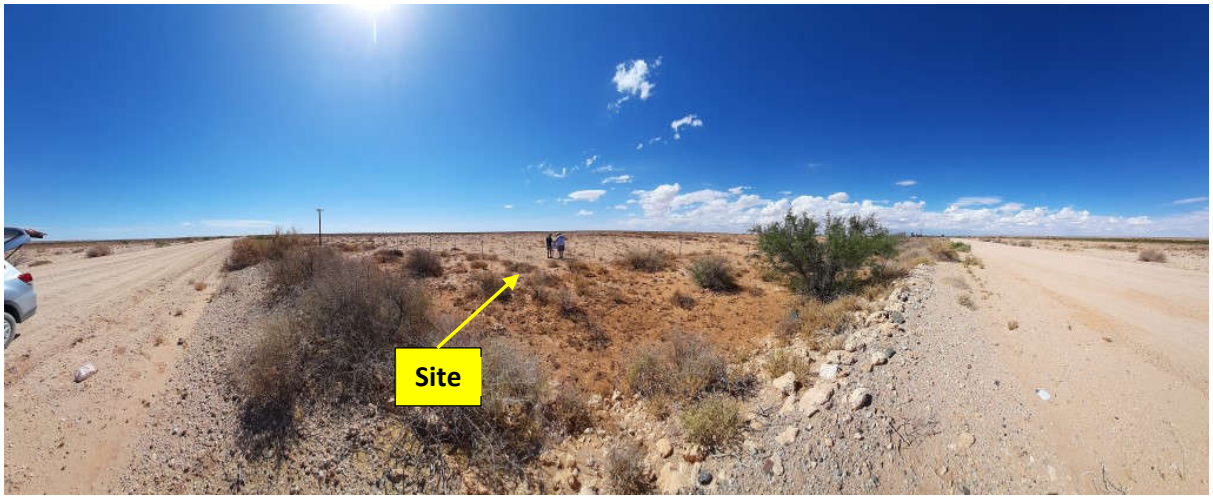

Figure 3.3: At new access point on R383 facing Site

Figure 3.4: View in western direction from Access Option C

Figure 3.5: View in eastern direction from Access Option C

The sight lines in both directions at the proposed access point Option C are good (see Figures **3.4** and **3.5**) as the access point will be located on a straight stretch of the R383 (see **Figure 3.6**).

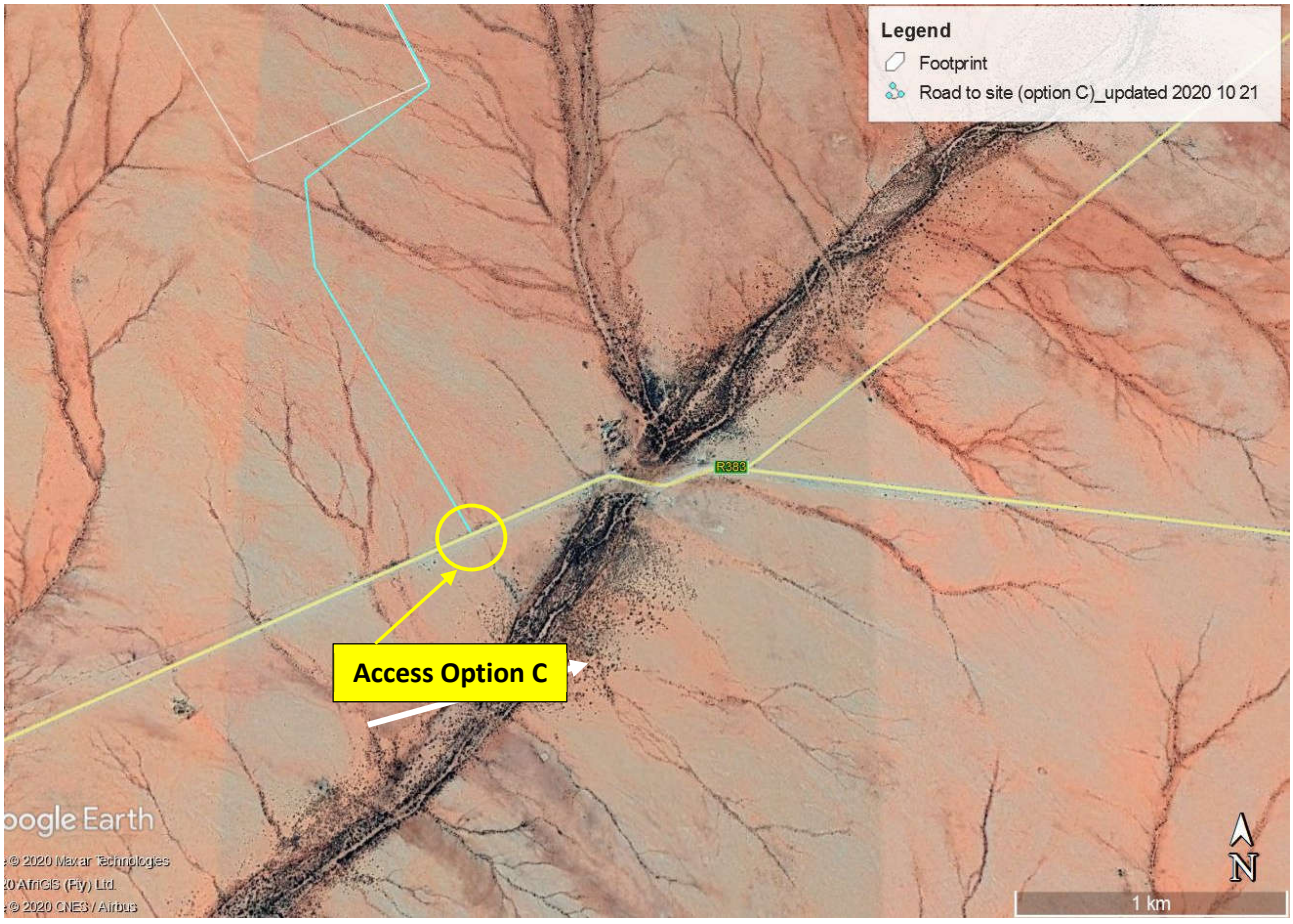

Figure 3.6: Recommended location on R383 of Access point Option C

Access point Option C **is deemed the preferred access point.** The access point needs to be upgraded to cater for the construction vehicles navigating the road to the laydown areas on site. Generally, the road width at the access point needs to be a minimum of 6m and the access roads on site a minimum of 5m. The radius at the access point from the R383 needs to be large enough to allow for all construction vehicles to turn safely. The exact location and design of the internal access road needs to be established at detailed design stage.

It is recommended that the site access be controlled via a boom and gatehouse. Security staff is to be stationed on site at the access boom during construction and an electronic number plate reader can be implemented once the solar farm is in operation. It is recommended to allow for at least 25m stacking distance at the boom access to the site.

4 APPLICABLE LEGISLATION AND PERMIT REQUIREMENTS

Key legal requirements pertaining to the transport requirements for the proposed WEF development are:

- Abnormal load permits, (Section 81 of the National Road Traffic Act 93 of 1996 and National Road Traffic Regulations, 2000);
- Port permit (Guidelines for Agreements, Licenses and Permits in terms of the National Ports Act No. 12 of 2005), and
- Authorisation from Road Authorities to modify the road reserve to accommodate turning movements of abnormal loads at intersections.

5 IDENTIFICATION OF KEY ISSUES

5.1 Identification of Potential Impacts

The potential transport related impacts are described below.

5.1.1 Construction Phase

Potential impact

- Construction related traffic
- The construction traffic would also lead to noise and dust pollution.
- This phase also includes the construction of roads, excavations, trenching and ancillary construction works that will temporarily generate the most traffic.

5.1.2 Operational Phase

During operation, it is expected that staff and security will visit the facility. Approximately 20 skilled and 40 unskilled employment opportunities will be created over the 20-year lifespan per site. The traffic generated during this phase is deemed minimal and will not have an impact on the surrounding road network.

5.1.3 Decommissioning Phase

This phase will result in the same impact as the Construction Phase as similar trips are expected.

5.1.4 Cumulative Impacts

- Traffic congestion/delays on the surrounding road network.
- Noise and dust pollution

6 ASSESSMENT OF IMPACTS AND IDENTIFICATION OF MANAGEMENT ACTIONS

6.1 Potential Impact (Construction Phase)

Nature of the impact

- Potential traffic congestion and delays on the surrounding road network and associated noise and dust pollution.

Significance of impact without mitigation measures

- Traffic generated by the construction of the facility will have a significant impact on the surrounding road network. The exact number of trips generated during construction will be determined by the contractor and the haulage company transporting the components to site, the staff requirements and where equipment is sourced from.

Trip Generation

Traffic generated by the construction of the facility will have a significant impact on the surrounding road network. The exact number of trips generated during construction will be determined by the haulage company transporting the components to site, the staff requirements and where equipment is sourced from.

From experience on other projects of similar nature, the number of heavy vehicles per 7MW installation is estimated to range between 200 and 300 trips depending on the site conditions and requirements. Kenhardt 1 to 6 will consist of 100MW each, totaling 600MW for the six facilities. For the 600MW, the total trips can therefore be estimated to be between 17 143 and 25 715 heavy vehicle trips. Looking at a 12-month construction period with an average of 22 working days per month and choosing the worst-case scenario of 25 715 trips, the resulting daily number of vehicle trips is approximately 98. Considering that the number of vehicle trips during peak hour traffic in a rural environment can roughly be estimated at around 20-40% of the average daily traffic, the resulting vehicle trips for the construction phase are approximately 20-39 trips. It is expected that this number of trips can be accommodated by the general traffic on the surrounding road network. A longer construction period would reduce the impact of generated trips on the road network, i.e. a construction period of 24 months would result in between 10-20 trips per day (worst-case scenario).

If the PV panels are to be imported instead of manufactured within South Africa, the respective shipping company will be able to indicate how the panels can be packed (for example using 2MW packages and 40ft containers). These can then be stored at the port and repacked onto flatbed trucks.

The significance of the transport impact without mitigation measures during the construction phase can be rated as medium. However, considering that this is temporary and short term in nature, the impact can be mitigated to an acceptable level.

Proposed mitigation measures

- The delivery of components to the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.
- Dust suppression of gravel roads during the construction phase, as required.
- Regular maintenance of gravel roads by the Contractor during the construction phase and by the

Owner/Facility Manager during the operation phase.

- The use of mobile batch plants and quarries near the site would decrease the traffic impact on the surrounding road network.
- Staff and general trips should occur outside of peak traffic periods as far as possible.
- If required, low hanging overhead lines (lower than 5.1m) e.g. Eskom and Telkom lines, along the proposed routes will have to be moved to accommodate the abnormal load vehicles.
- The preferred route should be surveyed to identify problem areas (e.g. intersections with limited turning radii and sections of the road with sharp horizontal curves or steep gradients, that may require modification). After the road modifications have been implemented, it is recommended to undertake a "dry-run" with the largest abnormal load vehicle, prior to the transportation of any components, to ensure that delivery will occur without disruptions. This process is to be undertaken by the haulage company transporting the components and the contractor, who will modify the road and intersections to accommodate abnormal vehicles. It needs to be ensured that the gravel sections of the haulage routes remain in good condition and will need to be maintained during the additional loading of the construction phase and reinstated after construction is completed.
- Design and maintenance of internal roads. The internal gravel roads will require grading with a grader to obtain a flat even surface and the geometric design of these gravel roads needs to be confirmed at detailed design stage. This process is to be undertaken by a civil engineering consultant or a geometric design professional.

6.2 Potential Impact (Operational Phase)

Nature of the impact

- Potential traffic congestion and delays on the surrounding road network and associated noise and dust pollution.

Significance of impact without mitigation measures

- Traffic generated during the operation of the facility will not have a significant impact on the surrounding road network. Approximately 20 skilled and 40 unskilled employment opportunities will be created over the 20-year lifespan (not all fulltime) per facility with a total of 120 skilled to 240 unskilled employment opportunities for the six PV facilities. It is expected that these labors will commute to the site via available shuttle buses or taxis.

The developer may investigate the use of borehole water for the cleaning of the PV panels. Should rainwater or borehole water not be available or suitable, the following assumptions have been made to estimate the resulting trips generated from transporting water to the site:

- 5 000 litre water bowsers to be used for transporting the water
- Approximately 5 litres of water needed per panel
- A range of between 180,000 and 202,000 solar panels are expected for each site
- Assuming the worst-case scenario of 202,000 solar panels, the total number of trips is therefore approximately 202 water bowsers per site. The total for all six facilities would result in 1 212 trips, which are expected to be scheduled over a two-week period (10 workdays – 8 hours per day). A worst-case scenario of approximately 15 trips can then be estimated per hour for the duration of cleaning of the panels.

- Panels will be cleaned up to four times a year.

It is expected that these trips will not have a significant impact on external traffic. However, to limit the impact, it is recommended to schedule these trips outside of peak traffic periods. Additionally, the provision of rainwater tanks at the site is expected to decrease the number of trips.

6.3 Potential Impact 2 (Decommissioning Phase)

The decommissioning phase will result in the same impact as the Construction Phase as similar trips are expected. The potential traffic impact will be of medium significance before mitigation measures during the construction and decommissioning phases. However, considering that this is temporary and short term in nature, the impact can be mitigated to an acceptable level of low significance.

7 IMPACT ASSESSMENT SUMMARY

The assessment of impacts and recommendation of mitigation measures as discussed above are collated in the tables below. The assessment methodology is attached as **Annexure A**.

Table 7-1: Impact Rating - Construction Phase – Traffic Congestion

IMPACT TABLE – CONSTRUCTION PHASE		
Environmental Parameter	*Traffic Congestion due to an increase in traffic caused by the transportation of equipment, material and staff to site*	
Issue/Impact/Environmental Effect/Nature	*Transport of equipment, material and staff to site will lead to some congestion.*	
Reversibility	*Completely reversible*	
Irreplaceable loss of resources	*No loss*	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	Local (2)	Local (1)
Probability	Highly probable (4)	Improbable (2)
Duration	Very Short (1)	Very Short (1)
Magnitude	Moderate (6)	Low (4)
Significance rating	Medium (36)	Low (12)
Mitigation measures	• *Stagger component delivery to site* • *Reduce the construction period* • *The use of mobile batch plants and quarries in close proximity to the site* • *Staff and general trips should occur outside of peak traffic periods.* • *Regular maintenance of gravel roads by the Contractor during the construction phase and by Client/Facility Manager during operation phase.*	
Residual Risks:	• *None, Traffic will return to normal levels after construction is completed.*	

Table 7-2: Impact Rating - Construction Phase – Dust Pollution

IMPACT TABLE – CONSTRUCTION PHASE		
Environmental Parameter	*Air quality will be affected by dust pollution*	
Issue/Impact/Environmental Effect/Nature	*Traffic on roads will generate dust.*	
Reversibility	*Completely reversible*	
Irreplaceable loss of resources	*No loss*	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	Local (2)	Local (1)
Probability	Highly probable (4)	Improbable (2)
Duration	Very Short (1)	Very Short (1)
Magnitude	Moderate (5)	Minor (2)
Significance rating	Medium (32)	Low (8)
Mitigation measures	• *Dust Suppression of gravel roads during the construction phase, as required.* • *Regular maintenance of gravel roads by the Contractor during the construction phase and by Client/Facility Manager during operation phase.*	
Residual Risks:	• *Dust pollution during the construction phase cannot be completely mitigated but mitigation measures will significantly reduce the impact. Dust pollution is limited to the construction period.*	

Table 7-3: Impact Rating - Construction Phase – Noise Pollution

IMPACT TABLE – CONSTRUCTION PHASE		
Environmental Parameter	*Noise pollution due to increased traffic.*	
Issue/Impact/Environmental Effect/Nature	*Traffic on roads will generate noise.*	
Reversibility	*Completely reversible*	
Irreplaceable loss of resources	*No loss*	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	Local (2)	Local (1)
Probability	Highly probable (4)	Improbable (2)
Duration	Very Short (1)	Very Short (1)
Magnitude	Moderate (5)	Minor (2)
Significance rating	Medium (32)	Low (8)
Mitigation measures	• *Stagger component delivery to site* • *Reduce the construction period as far as possible* • *The use of mobile batch plants and quarries in close proximity to the site* • *Staff and general trips should occur outside of peak traffic periods*	
Residual Risks:	• *Noise pollution during the construction phase cannot be completely mitigated but mitigation measures will significantly reduce the impact. Noise pollution is limited to the construction period.*	

Table 7-4: Impact Rating - Operation Phase

IMPACT TABLE – OPERATION PHASE
The traffic generated during this phase will be negligible and will not have any impact on the surrounding road network.

Table 7-5: Impact Rating - Decommissioning Phase

IMPACT TABLE – DECOMMISSIONING PHASE
This phase will have the same impact as the Construction Phase i.e. traffic congestion, air pollution and noise pollution, as similar trips/movements are expected.

8 CUMULATIVE IMPACTS

To assess the cumulative impact, it was assumed that any renewable energy projects within 50km currently proposed and authorized, would be constructed at the same time. This is the precautionary approach as in reality these projects would be subject to a highly competitive bidding process. Only a handful of projects would be selected to enter into a power purchase agreement with Eskom, and construction is likely to be staggered depending on project-specific issues.

The construction and decommissioning phases are the only significant traffic generators for renewable energy projects. The duration of these phases is short term (i.e. the impact of the generated traffic on the surrounding road network is temporary and renewable energy facilities, when operational, do not add any significant traffic to the road network). Even if all renewable energy projects within the area are constructed at the same time, the roads authority will consider all applications for abnormal loads and work with all project companies to ensure that loads on the public roads are staggered and staged to ensure that the impact will be acceptable.

The assessments of cumulative impacts are collated in the table below.

Table 8-1: Cumulative Impact

Nature: *Traffic generated by the proposed development and the associated noise and dust pollution in the vicinity of the proposed access point.*		
	Overall impact of the proposed project considered in isolation	**Cumulative impact of the project and other projects in the area**
Extent	Low (2)	Moderate (3)
Duration	Very Short (1)	Short (2)
Magnitude	Moderate (6)	Moderate (6)
Probability	Highly probable (4)	Definite (5)
Significance	**Medium (36)**	**Medium (55)**
Status (positive/negative)	Negative	Negative
Reversibility	High	High
Loss of resources?	No	No
Can impacts be mitigated?	Yes	Yes
Confidence in findings: High.		
Mitigation: • *Stagger component delivery to site* • *Dust suppression* • *Reduce the construction period* • *The use of mobile batch plants and quarries in close proximity to the site* • *Staff and general trips should occur outside of peak traffic periods*		

9 ENVIRONMENTAL MANAGEMENT PROGRAM INPUTS

It is recommended that dust suppression and maintenance of gravel roads form part of the EMPr. This would be required during the Construction phase where an increase in vehicle trips can be expected. No traffic related mitigation measures are envisaged during the Operation phase due to the negligible traffic volume generated during this phase.

Table 9-1: EMPr Input – Construction Phase

Impact	**Mitigation/Management Objectives**	**Mitigation/Management Actions**	**Monitoring**		
			Methodology	***Frequency***	***Responsibility***
A. CONSTRUCTION PHASE					
A.1. TRAFFIC IMPACTS					
Dust and noise pollution Transportation of material, components, equipment and staff to site	Minimize impacts on road network.	▪ Stagger component delivery to site ▪ The use of mobile batch plants and quarries near the site would decrease the impact on the surrounding road network ▪ Dust suppression ▪ Reduce the construction period as far as possible ▪ Maintenance of gravel roads	▪ Regular monitoring of road surface quality. ▪ Apply for required permits prior to commencement of construction	▪ Before construction commences and regularly during construction phase.	▪ Holder of the EA

Impact	Mitigation/Management Objectives	Mitigation/Management Actions	Monitoring		
			Methodology	***Frequency***	***Responsibility***
		▪ Apply for abnormal load permits prior to commencement of delivery via abnormal loads ▪ Assess the preferred route and undertake a 'dry run' to test ▪ Staff and general trips should occur outside of peak traffic periods as far as possible. ▪ Any low hanging overhead lines (lower than 5.1m) e.g. Eskom and Telkom lines, along the proposed routes will have to be moved to accommodate the abnormal load vehicles, if required			

10 CONCLUSION AND RECOMMENDATIONS

The potential traffic and road safety related impacts of the new proposed access point for the construction and operation phases for the proposed Kenhardt PV facilities were assessed.

- The construction phase traffic, although significant, will be temporary and impacts are considered to have a **low significance**.
- During operation, it is expected that staff and security will periodically visit the facility. Traffic generated during the operation of the facility will not have a significant impact on the surrounding road network. Approximately 20 skilled and 40 unskilled employment opportunities will be created over the 20-year lifespan (not all fulltime) per facility with a total of 120 skilled to 240 unskilled employment opportunities for the six PV facilities. It is expected that these labors will commute to the site via available shuttle buses or taxis.
- The new proposed access point is deemed to be well located along the R383 and suitable for the construction and operation stages of the project.

The general potential mitigation measures mentioned in the construction phase are:

- Dust suppression
- Component delivery to/ removal from the site can be staggered and trips can be scheduled to occur outside of peak traffic periods.
- The use of mobile batch plants and quarries near the site would decrease the impact on the surrounding road network.
- Staff and general trips should occur outside of peak traffic periods.
- Design and maintenance of the proposed access road.
- If required, any low hanging overhead lines (lower than 5.1m) e.g. Eskom and Telkom lines, along the proposed access road will have to be moved to accommodate any abnormal load vehicles.

The construction and decommissioning phases of a development are the only significant traffic generators and therefore noise and dust pollution will be higher during these phases. The duration of the phases is short term, i.e. the impact of the traffic on the surrounding road network is temporary and solar energy facilities, when operational, do not add any significant traffic to the road network.

The new proposed access road has been assessed from a road safety, sight lines and traffic movement perspective and is supported provided that the recommendations in this report are adhered to.

The development is supported from a transport perspective provided that the recommendations and mitigations contained in this report are adhered to.

11 REFERENCES

- Google Earth Pro
- Gouws. S: “Concrete Towers – a business case for sustained local investment”, Concrete growth, www.slideshare.net/SantieGouws/concrete-towers-a-business-case-for-sustainedinvestmentrev-5
- Road Traffic Act, 1996 (Act No. 93 of 1996)
- National Road Traffic Regulations, 2000
- SANS 10280/NRS 041-1:2008 - Overhead Power Lines for Conditions Prevailing in South Africa
- The Technical Recommendations for Highways (TRH 11): “Draft Guidelines for Granting of Exemption Permits for the Conveyance of Abnormal Loads and for other Events on Public Roads

Annexure A - ASSESSMENT METHODOLOGY

ASSESSMENT METHODOLOGY

Impacts were assessed in term of the following Assessment Criteria:

- The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.

- The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):

- The **duration**, wherein it will be indicated whether:
    - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
    - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
    - medium-term (5–15 years) – assigned a score of 3;
    - long term (> 15 years) - assigned a score of 4; or
    - permanent - assigned a score of 5;

- The **consequences (magnitude)**, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.

- The **probability** *of occurrence*, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).

- the **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high. The **significance** is calculated by combining the criteria in the following formula:

$$S=(E+D+M)*P$$

S = Significance weighting
E = Extent
D = Duration
M = Magnitude
P = Probability

The **significance weightings** for each potential impact are as follows:

    - < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
    - 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
    - > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

- the status, which will be described as either positive, negative or neutral.

- the degree to which the impact can be reversed.

- the degree to which the impact may cause irreplaceable loss of resources.

- the degree to which the impact can be mitigated.