ENVIRONMENTAL IMPACT ASSESSMENT

PROPOSED CONSTRUCTION AND IMPLEMENTATION OF A PHOTOVOLTAIC POWER PLANT ON THE REMAINING EXTENT OF KLONDIKE NO 670 NEAR VRYBURG IN THE NORTH WEST PROVINCE

APPLICANT: AMDA-FOXTROT (PTY) LTD

AGRICULTURAL SCOPING REPORT

17 March 2016

STUDY CONDUCTED AND
REPORT COMPILED BY: C R LUBBE

Cape Environmental Assessment
Practitioners (Pty) Ltd
Reg. No. 2008/004627/07
VAT No 4720248386
Telephone: (044) 874 0365
Facsimile: (044) 874 0432 5
1st Floor Eagles View Building
Progress Street, George
Web: www.cape-eaprac.co.za
PO Box 2070, George, 6530

AGRICULTURAL SPECIALIST:
C R Lubbe
6 Athlone Street
SWELLENDAM
6740

Contact person: Christo Lubbe
Tel: 028 514 2359
Mobile Phone: +27 82 853 1274
E-mail: macquarrie@vodamail.co.za

TABLE OF CONTENTS

1. INTRODUCTION 1
2. OBJECTIVES 1
3. APPROACH AND METHODOLOGY 1
   3.1. Desktop Study 1
   3.2. Field Investigation 1
4. ASSUMPTIONS AND UNCERTAINTIES 1
5. DESCRIPTION OF THE PROPOSED PROJECT 2
6. THE POTENTIALLY AFFECTED ENVIRONMENT 2
   6.1. Locality 2
   6.2. Physical description of site 2
   6.3. Geology 3
   6.4. Climate 3
   6.5. Soils 3
   6.6. Vegetation 4
   6.7. Topography 4
7. STUDY FINDINGS 4
   7.1. Surrounding Developments 4
   7.2. Past and Current Agricultural Activities on Site 5
   7.3. Soil Classification 5
      7.3.1. Summary .of soil properties 7
   7.4. Veld Condition Assessment 8
   7.5. Land Capability and Suitability for agriculture 8
   7.6. Water Availability/Provision 9
   7.7. Assessment of connecting lines 9
   7.8. Summary of findings 11
8. POSSIBLE IMPACTS 11
9. CUMMULATIVE EFFECTS ASSESMENT 11
10. CONCLUSION 12

Limitations
References
Appendix A: Curriculum Vitae of Specialist
Appendix B: Declaration of Independence

List of Tables

Table 1: Climate data 3
Table 2: Soil Forms 6
Table 3: Land Capability and Suitability Assessment for Crop Production 8
Table 4: Land Capability and Suitability Assessment for Grazing 9

List of Figures

Figure 1: Location of the proposed power facility 2
Figure 2: Layout of the site – Also see Figure 3 4
Figure 3: Surrounding Developments – see Figure 2 for number explanations 5
Figure 4: Observation points on soil map 6
Figure 5: Veld condition (see Figure 4 for these observation points 8
Figure 6: Connection line 9
Figure 7: Route of the proposed connecting line 10
Figure 8: Renewable Energy Farms in the Vryburg area 11

1. INTRODUCTION

Cape Environmental Assessment Practitioners (Pty) Ltd is conducting an Environmental Impact Assessment for AMDA-Foxtrot (Pty) Ltd to construct a solar power plant. The development site is on the remaining extent of the farm Klondike No 670 near Vryburg in the North West Province

The EIA is conducted for environmental authorisation under the National Environmental Management Act (Act 107 of 1998), as amended. As part of this EIA, an agricultural scoping study has been commissioned to scope possible impacts of the project on its immediate agricultural environment.

This document reports on a study that focuses specifically on the potential impacts of the project on **agriculture**. CR Lubbe undertook the study during February 2016. The scope and purpose of the study are described in detail below.

2. OBJECTIVES

The objectives of this study were to consider the possibility of temporary and permanent impacts on agricultural production that may result from the construction and operation of the PV Power Plant. Appropriate mitigation measures would be recommended to avoid or minimise the severity of the impacts.

3. APPROACH AND METHODOLOGY

3.1. Desktop Study

A desktop study was conducted to review existing data and literature sources. The desktop review provided a baseline agricultural and land use profile, focusing on the specific geographical area potentially impacted by the proposed project.

3.2. Field Investigation

The site was visited and assessed for land use and agricultural potential. An augering survey was carried out and plotted and soil groups were indicated in uniform polygons.

Potential impacts of the proposed project on agriculture were identified and considered, with particular attention to the following aspects:

- The possibility of permanent loss of high potential agricultural land;
- Impairment of land capability due to construction;
- Veld conditions for grazing.
- Analysis of erosion risk because of altered drainage patterns and poor rehabilitation in erosion-sensitive areas.

4. ASSUMPTIONS AND UNCERTAINTIES

A study of this nature will inherently contain various assumptions and limitations.

As far as **regional** information is concerned, this is primarily a desktop-based study. Climatic conditions, land uses, land type and terrain are readily available from literature, GIS information and satellite imagery.

Notwithstanding these limitations, the **site-specific** field studies confirmed most of the desktop findings and I am confident that the findings provide sufficient detail for the agricultural potential study reported in this document.

5. DESCRIPTION OF THE PROPOSED PROJECT

The company AMDA Foxtrot (Pty) intents to construct a 75 MW Solar PV facility on the remaining extent of the farm Klondike No 670 west of Vryburg in the North West Province.

The technology to be used will be either a fixed tilt structure or a single axis tracking structure

The total property size of the farm is 1142.4853ha, but the total development area will be approximately 221 ha, including the solar PV field, a sub-station, office buildings and roads.

. The project will connect to the proposed Moodkodi MTS approximately 5km to the East (

6. THE POTENTIALLY AFFECTED ENVIRONMENT

This section provides a general description of the immediate environment potentially affected by the construction, operation and closure of the proposed PV power plant.

6.1. Locality

The proposed power facility will be located Power Plant will be located approximately 8km west-southwest of Vryburg and bordered by the N14 and Reivilo roads – see Figure 1.

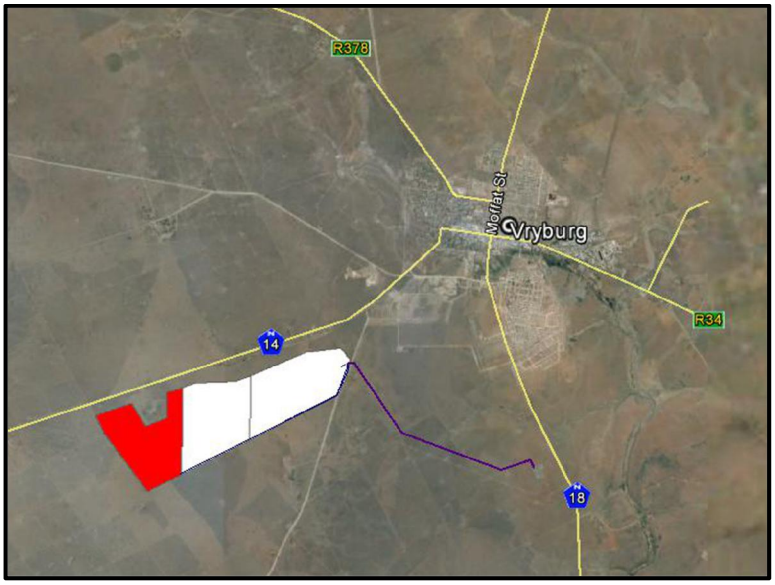

Figure 1: Location of the proposed power facility

6.2. Physical description of site

The farm is very close to Vryburg in the North West province, next to the N14 national road. The region is known for its beef production and cultivated land is scarce because of the low rainfall and shallow soils. Urban development in the form of Lodge type accommodation exists next to the N14 and formal housing next to the Reivilo road, which forms the north and eastern boarders of the site. The south and western boarders are natural grazing farms.

Extensive cattle farming is practised on savannah veld that was strengthened by the establishment of Wool grass (*Anthephora pubescens*).This took place about 15 years ago, according to the owner. No signs of cultivating activities were noticed.

The property is fenced with high game fencing on the borders and internal fencing for grazing camps. Two boreholes equipped with engines and powerheads provide stock watering.

6.3. Geology

The geology is of the Transvaal Rooiberg Griqualand Supergroup. Sedimentary and Volcanic rocks of this sequence include Dolomite (90%) and Sandstone (10%).

Diagnostic for this geology is surface limestone of Tertiary to Recent age and fine and coarse-grained dolomite, chert and dolomitic limestone with prominent interbedded chert, limestone and banded ironstone (Ghaap Plateau Formation, Campbell Group).

6.4. Climate

The region is classified as a semi-arid zone with desert climate.

The following specific parameters are applicable:

Table 1: Climate data

Climate				
Rainfall		**Evaporation**	**Temperature**	
Month	**Precipitation monthly**	**Daily**	**Season**	**Temperature**
January	74mm	6.6mm	Summer Max	31.1-35°C
February	78mm	5.4mm	Summer Min	29.3-31°C
March	84mm	4.6mm	Winter Max	21.9-24°C
April	32mm	3.6mm	Winter Min	0.1-Minus 2
May	18mm	2.5mm		
June	10mm	2.0mm		
July	2mm	2.2mm		
August	6mm	3.2mm		
September	13mm	4.6mm		
October	28mm	5.5mm		
November	51mm	6.3mm		
December	61mm	6.6mm		

6.5. Soils

According to AGIS, the predicted land type is *Fc*, which accommodates pedological young landscapes in which alluvial or Aeolian rock can be found. The dominant soil forming processes have been rock weathering. *Fc* specially refers to the fact that lime occur regularly in the soil profile.

Soils in this group usually show the following characteristics:

- Soils have minimal development, are usually shallow, on hard or weathering rock, with or without intermittent diverse soils.
- Lime is generally present in part or most of the landscape.
- Red and yellow well-drained sandy soil with high base status may occur.
- Freely drained, structure less soils may occur.
- Soils may have favourable physical properties.

- Soils may also have restricted depth, excessive drainage, high erodibility and low natural fertility.

6.6. Vegetation

Tropical Bushland savanna type (Bushveld according to Acocks). The vegetation type is Ghaap Plateau Vaalbos in a Savanna biome. The regional land cover is classified as thicket, bushland clumps and high fynbos.

According to Thomas (2008), the site falls in the Kalahari Vaalbos ecozone. Silvery grey-leaved trees and shrubs dominate the Vaalbos zone (hence the name: Vaalbos). Shrubs include Camphor bush, Velvet Raisin, African Olive, and Shepherds Tree. Large trees, such as Camel thorn, Sweet thorn and Karee-Rhus also occur.

6.7. Topography

The terrain type is that of level plains with some relief and slope less than 2%. An aerial view indicates water bodies representing shallow pans or depressions

7. STUDY FINDINGS

The site was visited in February 2016

7.1. Surrounding Developments

Figure 2: Layout of the site – Also see Figure 3

The site is surrounded by stock farming activities – see Figure 2 and Figure 3

1. North :Shallow pan

2. East: Cattle handling facilities

3. South: Extensive cattle farming

4. West: Extensive cattle farming

Figure 3: Surrounding Developments – see Figure 2 for number explanations

7.2. Past and Current Agricultural Activities on Site

The past and current activities is extensive cattle farming. An older Google Earth image shows cultivation on a part of the farm (not the site), but this does not exist anymore... These cultivated lands were established with Wool Grass (*Anthephora pubescens)* and Blue Buffalo Grass *(Cenchrus ciliaris*) - grasses suited for the rainfall and soil. These grasses are now used as a standing hay and no mechanical harvesting takes place. According to the owner, this establishment took place in excess of fifteen years back.

The farm is divided in fourteen camps. Each group of four camps has a handling facility in the centre of the four camps and a water point. Stock watering is pumped from boreholes with powerheads and diesel engines to reservoirs and troughs.

7.3. Soil Classification

An augering survey was carried out. At each augering point (indicated by numbers on Figure 4), an observation record was completed.

The soil observation records in Table 2 are representative of the three soil forms found on the site. These are further described below each observation record.

The soils were then grouped in uniform utilization polygons, as illustrated in Figure 4.

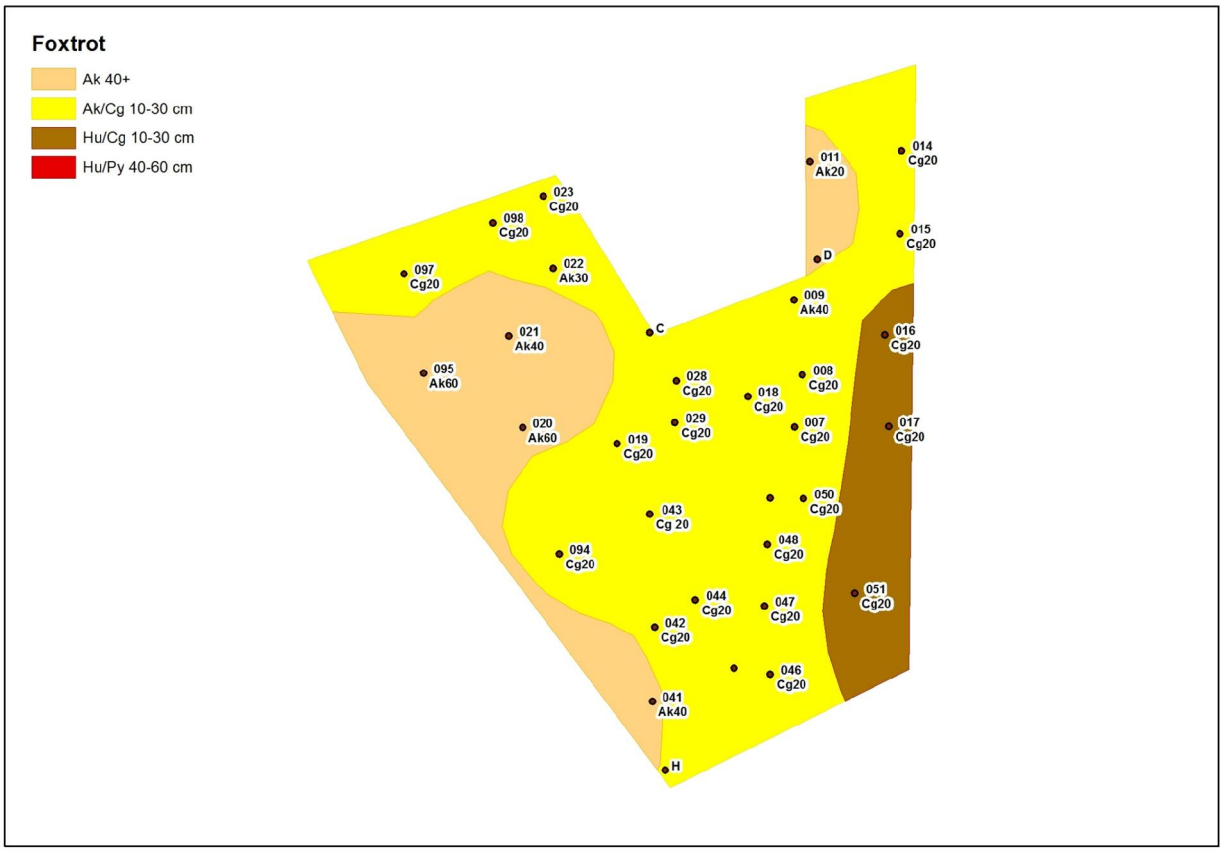

Figure 4: Observation points on soil map

Table 2: Soil Forms

OBS	20	COMMENT		Foxtrot											
LAT	27 00 04.7	SLOPE GRAD		1			MOISTURE		L						
LONG	24 38 43.0	SLOPE SHAPE		R			EROSION		L						
	FORM	Ak	TSD	60	WET	0	HOR	TYPE	DEPTH	COL	CLAY	S-GR	CONS	STRUC	STONE
	FAM	1000	ESD	60	C	I	1	A	20	7.5YR44	10	f	4	wc	0
	ROUGH	1	ASD	60	GEO	D1	2	B	60	7.5YR46	12	f	4	a	0
	TERR_POS	1	LTN	h	PHOTO	3162	3								
	L.COVER/USE:	savanna some Camel thorn low shrub													
	VIS.VELD.COND	A	11	B	7	C	3	D	8	E	2	TOTAL	31		

Askham (40-60 cm)

About 24% consists of the Askham form (Family Aroab).

20 cm brown, sandy, (fine grade) weak crumbly structure top soil.

40 cm strong brown sandy, (fine grade) with apedal structured sub soil.

Hardpan Carbonate horizon limiting layer.

OBS	42	COMMENT												
LAT	27 00 33.1	SLOPE GRAD		1		MOISTURE		L						
LONG	24 38 54.5	SLOPE SHAPE		R		EROSION		L						
	FORM	Cg	TSD	20	WET	0	HOR	TYPE	DEPTH	COL	CLAY	S-GR	CONS	STRUC	STONE
	FAM	1000	ESD	20	C	I	1	A	20	7.5YR44	10	f	4	wc	g2
	ROUGH	1	ASD		GEO	D1	2	C	151						
	TERR_POS	1	LTN	h	PHOTO	3181	3								
	L.COVER/USE:	Pan Vlei grass surface lime													
	VIS.VELD.COND	A		B		C		D		E		TOTAL			

Coega / Lithosol 20cm

About 65% consists of the Coega form (Family Nabies) and Lithosols complex.
0-30 cm brown, sandy, (fine grade) with single grain structure top soil.
Hard carbonate /rock at shallow depth.

OBS	51	COMMENT												
LAT	27 00 29.4	SLOPE GRAD		1		MOISTURE		L						
LONG	24 39 19.5	SLOPE SHAPE		R		EROSION		L						
	FORM	Cg	TSD	20	WET	0	HOR	TYPE	DEPTH	COL	CLAY	S-GR	CONS	STRUC	STONE
	FAM	1000	ESD	20	C	I	1	A	20	2.5Yr44	10	f	4	wc	0
	ROUGH	1	ASD		GEO	D1	2								
	TERR_POS	1	LTN		PHOTO	3185	3								
	L.COVER/USE:	shrub surface lime													
	VIS.VELD.COND	A		B		C		D		E		TOTAL			

Coega / Hutton

About 11% consists of the Coega form (Family Nabies) and shallow Hutton (Family Stella) complex.
0-30 cm reddish brown, sandy, (fine grade) with weak crumbly structure top soil.
Hard carbonate/ rock at shallow depth.

7.3.1. SUMMARY OF SOIL PROPERTIES

Effective rooting depth

More than 76% of the soil on the site has an effective depth of less than 30cm. The restriction is rock and hard carbonates sub surface layers. The top surface is also rough with a high level of surface rock. Cultivation is not possible because of these mechanical restrictions.

Some deep pockets of sandy soil with a depth of up to 60cm occur as indicated in Figure 4 and contribute to 24% or 67ha of the 282 ha surveyed.

The stony nature soils reduces available soil for root development and water retention.

High mechanical risk for agricultural machinery.

The very shallow soil depth with its limited water holding capacity restrict root development

Texture
The clay content top horizon is 10% and sub horizon is 12% with fine sand grade. Texture: class loam sand. The very fine sand grade of top soil influences the stability and erodibility potential.

Low clay percentage results in low water holding capacity and low nutrient availability, which leads to low soil fertility.

Depth limiting layer
Hard setting layer (Hard carbonate horizon) and/or Carbonate rock. The effects of this include:

- mechanical limitations for cultivation (Stoniness)
- Prevent root development
- Limit water holding capacity

Soils have carbonate-rich B-horizons. The use of Calcic soils is limited by climate (low rainfall and high evaporation), shallow soil depth, high pH, low plant available P and trace elements (especially Fe), toxic levels of extractable B and stoniness. All calcic soils are highly susceptible to water erosion.

7.4. Veld Condition Assessment

A veld condition assessment was done simultaneous with the soil survey, by visual acknowledgement.

The photos in Figure 5 show that the basal cover is low; consisting mainly of shrubs and poor grazing grasses. There is a moderate stand of Velvet raisin (*Grevia flava*). This shrub has high value as grazing shrub.

OBS 20 **OBS 42** **OBS 51**

Figure 5: Veld condition (see Figure 4 for these observation points)

7.5. Land Capability and Suitability for agriculture

The land surveyed falls in capability class VI, generally not suited for cultivation. Very severe limitations restrict land use to grazing, woodlands or wildlife - see Table 3 and Table 4.

Table 3: Land Capability and Suitability Assessment for Crop Production

Land capability class	Suitability Rating	Major Limitation to Crop Production	Area (ha)	% of Local Study Area
Class VI Cg/Lithosols	Very low	Low water holding capacity Shallow rooting zone Severe climate Severe erosion hazard	215ha	76
Class IV Ak>40cm	Low	Low water holding capacity Severe climate	67ha	24

Table 4: Land Capability and Suitability Assessment for Grazing

Area Description	Suitability Rating	Major Limitation to Grazing	Area (ha)	% of Local Study Area
Cattle	Medium -	Very shallow rooting depth on carbonate hard setting, low clay content, low rainfall, with carrying capacity of 7ha /LSU	282	100

7.6. Water Availability/Provision

Water is provided to livestock from a borehole pumped to a reservoir and troughs.

7.7. Assessment of connecting lines

The PV field is to be connected to the National grid via an overhead line to sub-station Mootkodi MTS. See Figure 6.

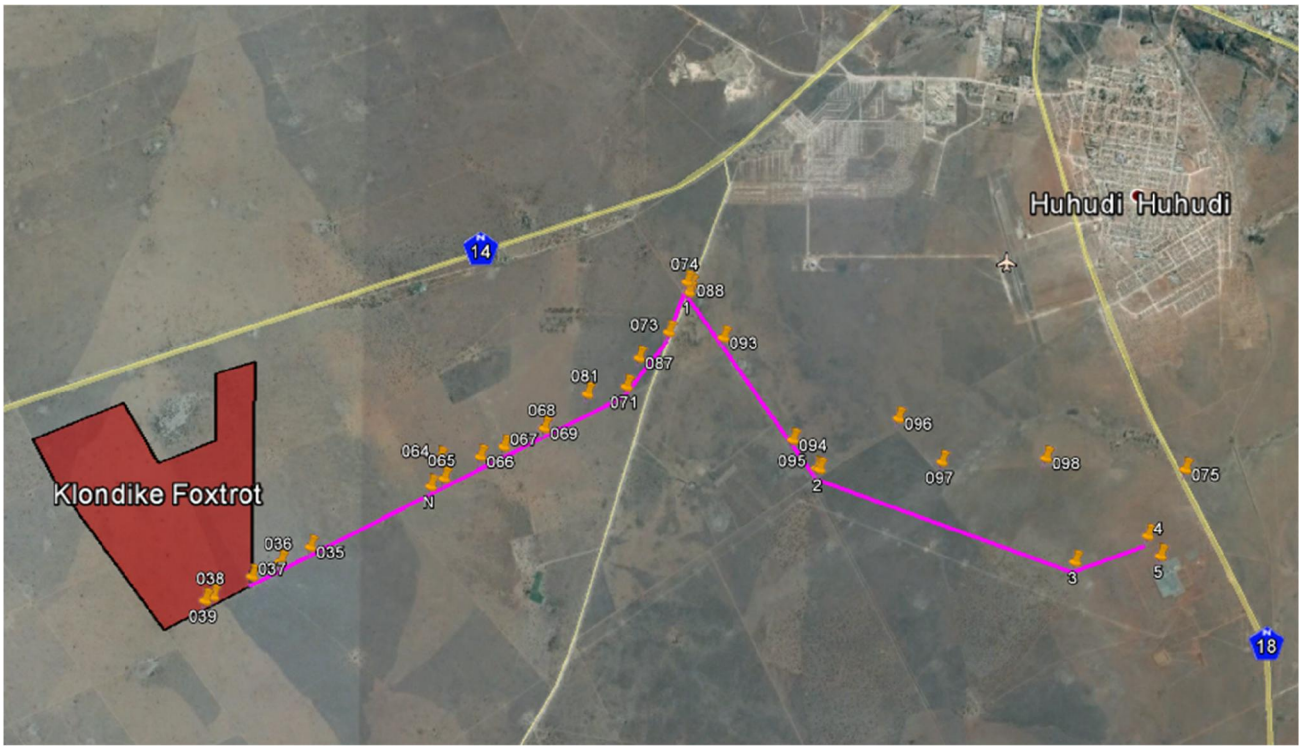

Figure 6: Connection line

Half of the connecting line will run inside the Klondike premises; from point 37 to 74 – refer Figure 6. The other half will follow an existing road (and powerlines) up to point 95. From here, still on the existing line and inspection road, to the power station (underneath the gridline from Vryburg). The soil is predominantly of very low agricultural value. The limiting factors are shallow soil depth and mechanical restrictions, due to a very high percentage stones in top and subsoil.

The only cultivation that takes place is at observation point 88 - a small centre pivot for cultivated pasture.

The land cover northeast of the road leading to the substation is natural veld with the nature of unattended land.

The photos in Figure 7 show the soil surface and vegetation on the alignment to the sub-station.

Point 37

Point 69

Point 73

Point 88

Between 93 and 94

Point 2

Point 96

On Reivilo road

Figure 7: Route of the proposed connecting line

7.8. Summary of findings

The site is largely unsuitable for cultivation due to the following limiting factors:

- Low annual rainfall, high evaporation and extreme temperatures restrict dry land cultivation.
- The very shallow soil depth with its limited water holding capacity restricts root development
- The soils have carbonate-rich B-horizons. The use of Calcic soils is limited by climate (low rainfall and high evaporation), shallow soil depth, high pH, low plant available P and trace elements (especially Fe), toxic levels of extractable B and stoniness. All calcic soils are highly susceptible to water erosion.
- The very fine sand grade of top soil influences the stability and increases erodibility potential.
- Low clay percentage results in low water holding capacity and low nutrient availability, resulting in low soil fertility.

Although the grazing potential is very low, the area could be utilised for grazing.

8. POSSIBLE IMPACTS

The following possible impacts should be considered:

- Loss of agricultural land.
- Placement of spoil material generated from construction related excavations, which can cover agricultural land and thereby render it unsuitable for future agriculture.
- Land surface disturbance and alteration of its run-off.

9. CUMMULATIVE EFFECTS ASSESMENT

Figure 8 shows the various farms on which similar developments are constructed / planned. In combination with this proposed AMDA Foxtrot facility, they may have a cumulative effect on the agricultural region.

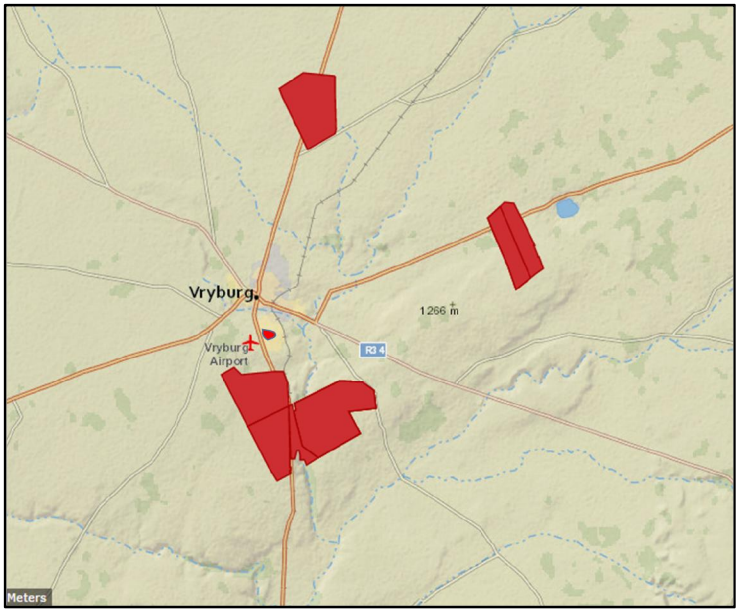

Figure 8: Renewable Energy Farms in the Vryburg area

(Source: Department of Environmental Affairs)

To assess the cumulative effect that the various developments may have on agriculture, the following situations will have to be addressed:

- History of activities in the geographic area
- Studies done which identified important effects.
- Test for involvement of the following:
    - Contamination of ground water supplies
    - Changes in hydrological regimes
    - Decreases in quantity and quality of soils
    - Loss of natural habitat or historic character through industrial development
    - Loss of biological diversity

10. CONCLUSION

The findings of this study indicate that the site's agricultural potential is low. Due to poor soil properties and extreme climatic conditions, farming activities consist of grazing for cattle.

The proposed power facility will have minimal impacts on agriculture, locally and on site, and will have very little influence on the current commercial farming.

Christo Lubbe

C R LUBBE **17 March 2016**

LIMITATIONS

This Document has been provided subject to the following limitations:

(i) This Document has been prepared for the particular purpose outlined in the proposal and no responsibility is accepted for the use of this Document in other contexts or for any other purpose.

(ii) CR Lubbe did not perform a complete assessment of all possible conditions or circumstances that may exist at the site referenced in the Document.

(iii) Conditions may exist which were undetectable given the limited nature of the enquiry CR Lubbe was retained to undertake with respect to the site. Variations in conditions may occur between investigatory locations, and there may be special conditions pertaining to the site which have not been revealed by the investigation and which have not therefore been taken into account in the Document. Accordingly, additional studies and actions may be required.

(iv) It is recognised that the passage of time affects the information and assessment provided in this Document. CR Lubbe's opinions are based upon information that existed at the time of the production of the Document. CR Lubbe's opinion rests on the actual conditions of the site at the time the site was visited and cannot be used to assess the effect of any subsequent changes in the quality of the site.

(v) Any assessments made in this Document are based on the conditions indicated from published sources and the investigation described. No warranty is included, express or implied, that the actual conditions will conform exactly to the assessments contained in this Document.

(vi) Where data supplied by the client or other external sources, including previous site investigation data, have been used, it has been assumed that the information is correct unless otherwise stated. No responsibility is accepted for incomplete or inaccurate data supplied by others.

(viii) This Document is provided for sole use by the Client and is confidential to it and its professional advisers. No responsibility whatsoever for the contents of this Document will be accepted to any person other than the Client. Any use which a third party makes of this Document, or any reliance on or decisions to be made based on it, is the responsibility of such third parties. CR Lubbe accepts no responsibility for damages, if any, suffered by any third party because of decisions made or actions based on this Document.

REFERENCES

AGIS, 2007. Agricultural Geo-Referenced Information System, accessed from www.agis.agric.za in April 2015.

Ashman M.R. and Puri G, 2002. *Essential Soil Science*. Blackwell, Oxford.

Department of Environmental Affairs: https://dea.maps.arcgis.com/apps/webappviewer/index.html?id=b8452ef22aeb4522953f1fb10e6dc79e, March 2016

Fey M, 2010. *Soils of South Africa*. Cambridge University Press, Cape Town

Soil Classification Working Group, 1991. *Soil Classification: A Taxonomic System for South Africa.* Department of Agricultural Development, Pretoria.

National Department of Agriculture, 2002. *Development and Application of a Land Capability Classification System for South Africa.* Unpublished report. Pretoria.

Thomas V, Moll E and Grant R., 2008. *Sappi Tree Spotting: Cape –From Coast to Kalahari.* Jacana, Johannesburg

Van der Watt H.v.H and Van Rooyen, T.H., 1995. *A Glossary of Soil Science*. Soil Science Society of South Africa, Pretoria. Blackwell, Oxford.

Van Oudtshoorn F.1994. *Gids tot Grasse van Suid-Afrika*. Briza, Arcadia.

Appendix A

Environmental Practitioner Curriculum Vitae

Christiaan Rudolf Lubbe

KEY QUALIFICATIONS:

National Higher Diploma in Agriculture (Irrigation), Technikon Pretoria, 1982
Certificate in Stereoscopic Interpretation, Geology and Resource Classification and Utilisation, Department of Agriculture, 1979
National Diploma in Agriculture, Technikon Pretoria, 1976

OTHER EDUCATION:

Certificate in Turf Grass Management, Technikon Pretoria, 1987
Certificate in Landscape Management, Technikon Pretoria, 1988
Cultivated pastures (Mod 320), University of Pretoria, 1995
FSC Auditors Course (Woodmark, UK), Sappi Ltd, 2003
NOSA Health and Safety Certificate, 1996
Certificate of Competence: Civil Designer - Design Centre and Survey and Design (Knowledge Base, August 2005)

EMPLOYMENT RECORD:

July 2006 to date	**CR LUBBE** Self employed Involved in various projects (see project related experience).	
June 2004- June 2006	**Gauteng Department of Agriculture Conservation and Environment** (Component: Technology Development and Support) **Acting Assistant Director: Resource Planning and Utilization**	**Johannesburg, SA**
Jan 1997 – May 2004	**CR LUBBE** **Self employed** Involved in various projects (See Project related experience below)	**Pretoria, SA**
1980 to 1996	**Technikon Pretoria** **Lecturer** Teaching Agricultural Engineering and Land Use Planning subjects. Teaching included practical courses, examination and moderation	**Pretoria, SA**
1974 - 1979	**Department of Agriculture (Transvaal Region)** **Senior Extension Technician** Farm Planning, Surveying, Design of soil conservation systems, Agricultural Extension.	**Carolina and Ermelo, SA**

SUMMARY OF EXPERIENCE

Has 42 years of experience in planning and managing natural resources to ensure optimal utilisation, without exploiting such resources to the detriment of future generations.

Fourteen years experience as a soil consultant, doing mainly soil surveys, terrain classification and agricultural potential studies. Reports include a variety of maps and GIS aspects thus play a large role in these surveys and studies.

Seventeen years of lecturing agricultural engineering subjects: Soil Conservation Techniques I, II and III, which dealt with the surveying, design and drawing of soil conservation structures; Farm Planning, which dealt with optimal resource utilization and Agricultural Mechanization, which dealt with the implements and machinery used to mechanize farming.

Ten years experience in the survey, design and supervising the construction of soil conservation structures in the agricultural field, mainly for farm planning.

PROJECT RELATED EXPERIENCE

PROJECTS UNDERTAKEN IN INDIVIDUAL CAPACITY

Cape EA **Apr 2015**
Agricultural Impact Assessment : EIA for the Construction and Operation of two Photovoltaic Power Stations at Kathu in the Northern Cape.

Savannah Environmental **Mar 2015**
Agricultural Impact Assessment : EIA for the Construction and Operation of a Wind Farm near Moorreesburg, Western Cape.

Department of Agriculture, Forestry and Fisheries **Mar 2015**
Eastern Cape Land Capability Verification Survey

Department of Agriculture, Forestry and Fisheries **Dec 2014**
Western Cape Land Capability Verification Survey

Cape EA **Aug 2014**
Agricultural Impact Assessment : EIA for the Construction and Operation of a Photovoltaic Power Station at Upington (RE Cap 5)in the Northern Cape.

Cape EA **Aug 2014**
Agricultural Impact Assessment : EIA for the Construction and Operation of a Photovoltaic Power Station at Postmasburg (RE Cap 5)in the Northern Cape.

Cape EA **Aug 2014**
Agricultural Impact Assessment : EIA for the Construction and Operation of a Photovoltaic Power Station at Upington (Joram) in the Northern Cape.

Cape EA **Aug 2014**
Agricultural Impact Assessment : EIA for the Construction and Operation of a Photovoltaic Power Station at Copperton (RE Cap 5) in the Northern Cape.

Cape EA **Aug 2014**
Agricultural Impact Assessment : EIA for the Establishment of a Cemetery at Zoar, near Ladismith in the Western Cape. .

Cape EA **Aug 2014**
Agricultural Impact Assessment : EIA for the Construction and Operation of a Photovoltaic Power Station at Copperton (RE Cap 5) in the Northern Cape.

Macroplan **Jun 2014**
Agricultural Impact Assessment: Application for rezoning of Agricultural land at Upington (Sweet Sensation), Northern Cape

Macroplan **Mar 2014**
Agricultural Potential Study: Application for change of land use at Upington (McTaggarts), Northern Cape

Agricultural Development Corporation **Jan to March 2014**
Design of Feedlot infrastructure and stock watering systems for Kenana Sugar in Sudan.

Cape EA **Nov 2013**
Agricultural Impact Assessment : EIA for the Construction and Operation of a Photovoltaic Power Station in the Richtersveld, Western Cape.

Cape EA **Jul 2013**
Agricultural Impact Assessment : EIA for the Construction and Operation of a Photovoltaic Power Station at Upington in the Northern Cape.

Cape EA **Oct 2012**
Agricultural Impact Assessment : EIA for the Construction and Operation of a Photovoltaic Power Station near Danielskuil in the Northern Cape.

Senter360 **Oct 2012**
Agricultural Potential Study for a Food Security Development Units in the Democratic Republic of the Congo.

Africa Livestock Project Development Consortium **Aug 2012**
Agricultural Impact Assessment for the Construction and Operation of a Beef Cattle Handlings Facility for a Sugar Company in Northern Sudan

Van Zyl Environmental Consultants **Mar 2012**
Agricultural Impact Assessment : EIA for the Construction and Operation of a Photovoltaic Power Station in the Northern Cape.

Bushveld Eco Services **Nov 2011**
Design and cost estimate of a stock watering system in the Lephalale disctrict.

WSM Leshika **Sep 2011**
Soil suitability survey for two new upcoming farmers at Vhuawela & Tshoga in the Limpopo Province.

National Department of Agriculture **Aug 2011**
Soil survey investigating soil potential for change of land use at the Levendal Development in the Paarl district, Western Cape.

Van Zyl Environmental Consultants **Mar 2011**
Agricultural Impact Assessment : EIA for the Construction and Operation of four Photovoltaic Power Stations in the Northern Cape.

WSM Leshika **Nov 2010**
Potential assessments and land use plans for four new upcoming farmers in the Limpopo Province.

FP Botha **Apr 2010**
Potential assessments and land use plans for various new Limpopo agricultural development hubs

Golder Associates Africa (Pty) Ltd **May 2009 – Apr 2010**
Potential assessments and Landuse plans for the resettlement of land tenants at Mafube Coal Mine in the Belfast district of the Mpumalanga Province

Sappi **Vryheid, RSA**
Undertook reconnaissance soil surveys on various plantations and farms in the Vryheid and Piet Retief districts to establish forestation potential and evaluation for species choice (covering a total area of 5173 ha).

Environmentek, CSIR **Nelspruit, RSA**
Undertook soil and terrain classification surveys on the Jessievale (8313 ha) and New Agatha (1 700 ha) plantations.

Safcol (Komatieland) **Limpopo Province**
Undertook environmental, soil and terrain classification surveys on the Thatevondo (4 500 ha), Mafela (920 ha) and Mmamatola (1 263 ha) plantations.

Measured Farming **Gabon, Swaziland & RSA**
Undertook soil and terrain classification surveys on Ranch Lope and Ranch Suba in Gabon, Kubuta Farm in Swaziland and on the farms Madikwe in the Limpopo Province and Stoffelsrus in the Free State, South Africa.

Loxton Venn and Associates **Potgietersrus, RSA**
Assess comparative soils and area for relocating Village Ga-Sekhaolelo on Overysel 815LR to Rooibokfontein 812LR and Village Ga-Puka on Swartfontein 818 LR to Armoed on Potgietersrus Platinum Mine.

Department of Water Affairs and Forestry **Gauteng**
GPS survey and alien identification for mapping of Jukskei and Swartspruit areas, as part of the Working for Water Program.

Sustainable Forestry Management Ltd **Limpopo and Mpumalanga**
Participated in a due diligence audit on various SAFCOL plantations in the Limpopo and Mpumalanga Provinces as part of the preparation of a British company's tender to purchase these plantations.

Mustek Engineering Ghana
Survey to provide a detailed inventory of the forest resources in 17 specified Forest Reserves in Ghana to develop a practical and operationally sound methodology for monitoring the natural forest resources in Ghana, based on satellite imagery for the Ghana Forestry Commission.

Afrigis Environmental Solutions, Pretoria
Various Soil Surveys and Landuse Plannings – Domestic and Neighbouring Countries

Rural Integrated Engineering, Pretoria
Various Soil Surveys and Landuse Plannings

Africa Land-Use Training, Modimole
Lectures at Basic Farm Planning Course (Limpopo and Gauteng)

Appendix B

Declaration of Independence

CR Lubbe was appointed by AMDA Foxtrot (Pty) Ltd via Cape Environmental Assessment Practitioners (Pty) Ltd, the EAP, to conduct an independent agricultural study for the proposed power facility near Vryburg.

He is not a subsidiary or in any way affiliated to AMDA Foxtrot (Pty) Ltd.

CR Lubbe also does not have any interest in secondary developments that may arise from the authorisation of the proposed project.

CR Lubbe

17 March 2015