WINE ESTATE
CAPITAL MANAGEMENT
SOUTH AFRICA

PROPOSED SOLAR POWER FACILITY
PORTION 7 OF OLYVEN KOLK 187
KENHARDT SOUTH AFRICA

REPORT ON
GEOTECHNICAL INVESTIGATIONS

September 2018

Compiled by:

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SKCM

TABLE OF CONTENTS

List of Figures:

List of Tables

List of Annexures:

1 EXECUTIVE SUMMARY

SKCMasakhizwe Engineers (Pty) Ltd (SKCM) was appointed by Greencontinent to perform a geotechnical investigation on Portion 7 of the Farm Olyven Kolk 187, approximately 30km south west of Kenhardt in the Northern Cape of South Africa.

The main objective of the investigation was:

1. To determine the consistency of the soil profile.
2. To assess the pH of the soils.
3. To evaluate the suitability of in-situ material for use in construction of the works.
4. To assess the agricultural potential of the proposed sites.
5. To assess the seismic risk of the sites.

The site is situated to the west of the Kenhardt/Pofadder gravel road and approximately 7km north-east of the existing Eskom Aries substation.

The proposed sites have a low risk of flooding and seismic activity in the area is limited. Ground movement is less than approximately 50cm/s with a 10% probability of exceeding this limit in 50 Years.

The agricultural potential of the sites is low and is suitable for limited grazing only, mainly due to the harsh climate, shallow soils and low annual rainfall.

The soil profile over the study area can be described as a loose to medium dense sand in the upper layer and generally underlain by dense to very dense calcareous pedogenic layers that disintegrate into coarse gravel during excavation. Only two of the fifteen trial pits could be excavated down to 1 700mm by the digger loader. For the rest of the trial pits, the depth to refusal varied from 250mm to 1 300mm. Sites B & C (Trail pits 4-10) could only be excavated down to an average depth of 300mm before machine refusal on the weathered rock.

Although the founding method (foundation screws or steel piles) for the solar panels is still to be determined, the dense nature of the soil poses a question mark whether the anchors will be able to penetrate the very dense material. Sites B & C with the shallow weathered rock (average 300mm deep) will most probably require an alternative concrete footing design for most of the installation. We propose that additional tests be conducted by the specialist contractor responsible for the design and installation of the footings for the panels.

The soil pH ranges between 6.4 and 6.9. The soils are therefore slightly corrosive. Conventional galvanising should be sufficient to protect critical elements in contact with the ground from corrosion.

The study area is considered to be suitable from a geotechnical perspective for the proposed development of a solar power facility but will most probably require different footings across the site.

2 INTRODUCTION AND TERMS OF REFERENCE

The company, Wine Estate Management, is investigating the feasibility of establishing a solar power facility near Kenhardt in the Northern Cape. The facility is situated in the close proximity of the existing Eskom Aries Substation. The site location is indicated in Figure 2, while the layout is indicated on Figure 3.

The objectives of the geotechnical study were as follows:

1. To determine the consistency of the soil by profiling the vertical succession of soil layers on the proposed sites.
2. To determine the pH and conductivity of the soils in order to evaluate the corrosive potential, with specific reference to the use of galvanised ground anchors as a founding system for the photovoltaic panels.
3. To evaluate the suitability of in-situ material for use in construction of the works.
4. To assess the agricultural potential of the proposed sites.
5. To assess the seismic risk of the area.

This report describes the results of the various investigations.

3 INFORMATION USED IN THE STUDY

3.1 List of Information

The following maps and supplementary information was consulted:

- 1:50 000 Topographic series map 2920 BD, Grootriet, Third Edition, 2003.
- 1:50 000 Topographic series map 2920 DB, Sonderhuis, Third Edition, 2003.
- Google Earth Images.
- 1:250 000 Geological Series Map, 2920 Kenhardt, and the associated explanation sheet entitled "The Geology of the Kenhardt Area". Geological Survey of South Africa, 1999.
- Site layout prepared by Messers Cape Lowlands Environmental Services.
- Agricultural Research Council Database (www.agis.agric.za) regarding soil classification, soil type and land capability.
- Soil Classification, a Taxonomic system for South Africa, Soil Classification Working Group, 1991 as published by the Department of Agricultural Development.
- Unsealed roads: Design, construction and maintenance. TRH 20, Pretoria.

SKCM Engineers were involved in previous geotechnical studies on the farm, dating back to 2011. Information gathered during the previous studies was incorporated in this report. Discussions with a local farmer, Mr M Van Niekerk, also provided insight into the local conditions.

3.2 Evaluation Procedures

Initial evaluations were made using the topographic map (2920BD Grootriet and 2920DB Sonderhuis), Google Earth Imagery and by studying the geological map (2920 Kenhardt) and associated explanation sheets.

Proposed site layout, as included in the Environmental Assessment report by Eco Impact, was also considered. The layout is included in this report as Figure 3.

The site has a gravel quarry in the north eastern corner, which is not in use. The geotechnical assessments are based on the results of trial pitting and laboratory testing.

4 SITE DESCRIPTION

The proposed sites are situated on the farm Olyven Kolk 187, approximately 30km south west of Kenhardt, as indicated in Figure 1.

The site is situated approximately 4km to the north east of the existing Olyvenhoutskolk homestead and to the west of the Kenhardt/Pofadder gravel road. The existing Eskom Aries Substation is approximately 8 km to the south-west (Figure 1). The site is bordered by the Kenhardt/Pofadder minor road on the eastern side and uncultivated farm land on the other sides. The farm is used mainly for sheep farming.

The site is situated in an arid region with rainfall of approximately 127mm per annum, mostly from December to May. Annual evaporation is expected to be between 2 600mm and 2 800mm. Average temperatures varies between approximately 20°C in July and 36°C in January.

The site slopes to the north west. There are two major and various minor water courses crossing the site. The water courses drain towards the Graafwater River. The water courses are defined by the change in vegetation in the water course due to the generally deeper soils. Except for the thorn shrubs, these water courses are not clearly defined. The positions of these drainage features are indicated on Figure 7. The terrain has a gentle slope of 1.3% to the north west. Very little to no erosion was observed.

Vegetation cover consists mainly of sparse grass and thorn shrubs.

5 NATURE OF THE INVESTIGATION

5.1 Desk Study

Prior to the site investigations, an initial geotechnical evaluation was done using the information contained in the 1:250 000 geological series map 2920 Kenhardt and the associated explanation sheet.

Site investigations were planned using Google Earth imagery and available Topographic maps. The positions of trial pits were determined on site taking into consideration the prevailing site conditions and the site layouts prepared by Eco Impact.

5.2 Site Investigations and Laboratory Testing

Site Investigations were conducted by Mr. MPJ Loubser (PrEng) of SKCM Engineers on 23 to 25 August 2018.

Trial pitting was conducted on 24 August 2018 using a Terex digger/loader hired from TR Plant Hire in Kakamas.

Laboratory testing was conducted by Matrocast Laboratories (Pty) Ltd at their laboratory in Brackenfell, Cape Town.

5.2.1 Trial Pitting

A total of 15 Trial Pits were analysed. The positions of the trial pits are indicated on Figure 5.

The aim was to excavate the trial pits to a depth of approximately 2.0m, since these are the layers in which the structures are expected to be founded. Machine refusal however varied from a depth of 250m to 1 300mm. Only two trail pits could be excavated to 1 700mm deep.

Trial pits were profiled according to standard South African practice and described in terms of the moisture content, colour, consistency, structure, soil type and origin (MCCSSO). The profile descriptions are included in Annexure A.

5.2.2 DCP Testing

A number of DCP tests have been done on the farm. The combined results of the tests, together with the energy required to excavate the trial pits, indicates that the soils have ample bearing capacity for the loadings envisaged. The results of the CBR test indicate that the material has a TRH classification of G7.

5.2.3 Laboratory Testing

Road indicator tests, including grading and CBR tests, Conductivity and pH tests were done on various samples.

The result of the laboratory testing is included in Appendix B.

6 SITE GEOLOGY AND GROUNDWATER CONDITIONS

6.1 General Geology

A portion of the 1:250 000 Geological Series Map 2920 Kenhardt, showing the location of the site, is presented as Figure 6.

Based on the Geological Series Map, the area in the vicinity of the site is masked by red brown Aeolian soils of Quaternary age (Q) of the Kalahari Group, Gordonia Formation. These soils are underlain by soils and weathered rock of the Karoo Supergroup, Dwyka Group (C-Pd), comprising Carboniferous Tillite, Diamictite, subordinate Sandstone, Mudstone and Dolomitic Limestone.

6.2 Site Geology and soil profile

The site is overlain with brown to reddish brown Aeolian soils that form the topsoil layer (Orhic A diagnostic horison). Below this layer, a hard calcareous pedogenic layer is encountered that disintegrates into coarse gravel when excavated. The diagnostic layers can be identified as a Neocarbonate B horizon underlain by Dorbank or a hardpan carbonate horizon.

Using these diagnostic horizons and information contained on the Agricultural Research Council database (ARC) (www.agis.agric.za), the soils of the site is classified as Augrabies and Trawal soil forms.

Dolorite outcrops and cobbles are evident on the surface layer of the site.

6.3 Water Table

No seepage water or water table was observed during trial pitting.

7 GEOTECHNICAL EVALUATION

7.1 Engineering and material characteristics and constraints

7.1.1 Site Topography

The gentle slopes (1.3 %) of the site will aid storm water drainage and prevent ponding of surface water. Due to the gentle slope of the terrain, the risk of erosion will remain low.

7.1.2 Soil Profile

The general soil profile comprises a layer of medium to coarse sand underlain by a calcareous pedogenic layer that is dense to very dense in the undisturbed form. This material disintegrates into coarse gravel during excavation.

The soils that cover most of the site are silty sand and gravel with a low heave classification. Closer to the drainage lines, the sands tend to be deeper and finer with lower clay content.

The overlying soils are very shallow (250mm to 500mm deep) for most of Sites B & C. Rocky outcrops were also observed in this area.

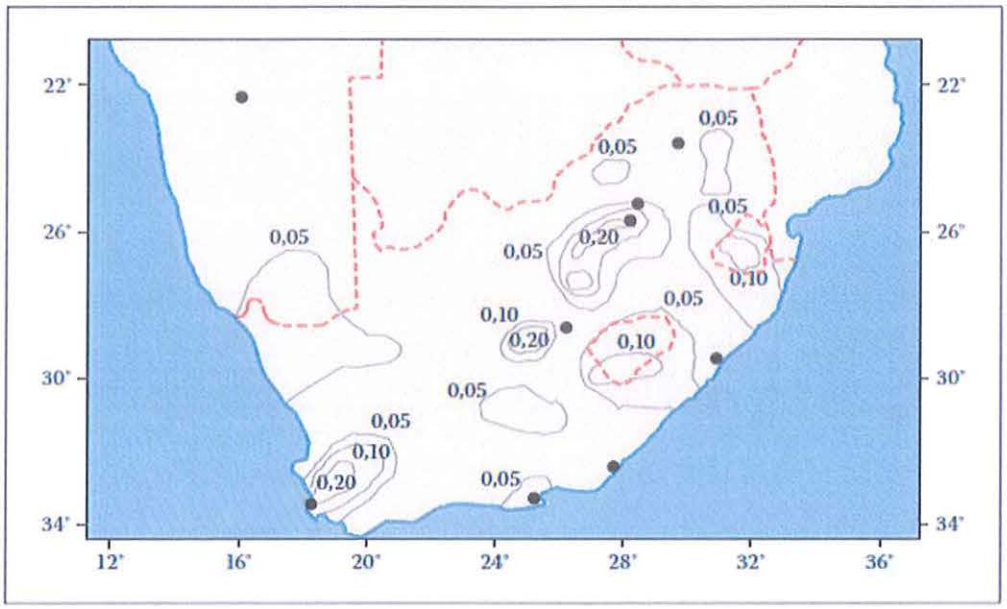
The various soil types found on the farm were analysed previously and are included in this report. The general soil parameters of the samples are as follows:

1) Material Classification: Sand
2) Plasticity Index: NP to SP
3) Linear Shrinkage: 0 – 0.5%
4) Heave Classification: Low
5) Grading Modulus: 2.20 – 2.56
6) PH : 6.4 -6.9

7.1.3 Seismic Activity

According to the seismic hazard map contained in SABS 0160-1993, (reproduced as Figure 7 below), the proposed sites are located in an area where the peak ground acceleration will not exceed 0.05g (gravity acceleration) or approximately 50cm/s², with a 10% probability of exceeding this limit in 50 years.

Figure 6: Seismic hazard map from SABS 0160-1993



According to a map produced by the United Nations Office for the Coordination of Humanitarian affairs, depicting earthquake intensity zones in Africa (reproduced in Appendix C), the proposed sites are located in a area where earthquake magnitude may vary from instrumental to fairly strong. (Earthquake intensity degree I –V according to the Modified Mercalli scale of 1956.)

No incidences of widely perceived seismic activity have been recorded in the area. No special foundation measures are therefore required due to possible seismic activity.

7.1.4 Conductivity and pH

The conductivity and pH gives us an indication of the corrosion potential of the soils.The pH of the soil varies between 6.4 and 6.9. The soils are therefore expected to be very slightly corrosive. Conventional galvanising of critical elements in contact with the soil will provide adequate long term corrosion protection to all metal elements.

7.1.5 CBR test results

Material identified as road building material, was found to have a CBR of 36 at 95% of MOD AASHTO. The material has a TRH classification of G7 and a COLTO classification G6. This material will be suitable as a sub base layer in the roads. The material is however not suitable for use as a wearing course on the gravel access roads. It is therefore recommended that an investigation be commissioned to identify borrow pits in the vicinity of the site where suitable material for use as a wearing course may be found if required.

7.1.6 Load Bearing capacity of the soils

Although the founding method (foundation screws or steel piles) for the solar panels is still to be determined, the dense nature of the soil poses a question

mark whether the anchors will be able to penetrate the very dense material. The vertical and horizontal load bearing capacity of the soil will be sufficient to transmit vertical compression and horizontal loads applied to the screws. Pull out resistance of the screws should be sufficient if the screws are placed deep enough into the calcareous pedogenic material below the sand layers, since minimal wind loads is expected on the screws due to the elevation of the Photovoltaic panels.

Although the founding method (foundation screws or steel piles) for the solar panels is still to be determined, the dense nature of the soil poses a question mark whether the anchors will be able to penetrate the very dense material. Sites B & C with the shallow weathered rock (average 300mm deep) will most probably require an alternative concrete footing design for most of the installation. We propose that additional tests be conducted by the specialist contractor responsible for the design and installation of the footings for the panels.

8 FLOOD RISK

A flood risk assessment was conducted under a separate study. The flood lines are indicated in Figure 7.

As can be seen from this drawing, the proposed photovoltaic panel sites are located outside the 1:100 year flood plain. Minor earthworks might be required to form a cut off drain to divert sheet flow storm water away from the sites. The risk of flooding and associated damage to the structures is in our opinion, low.

9 AGRICULTURAL POTENTIAL

The following information was obtained from the ARC (www.agis.agric.za) database regarding the agricultural potential of the sites.

Table 1: Agricultural Potential

Land Type No	Ag2
Land Capability Class	VII
Land use option	Light Grazing

A land Capability Class VII is defined as follows:

(source: http://www.agis.agric.za/agisweb/?MIval=land_capability&rb=Land_capability_soil_capability)

Land in Class VII has very severe limitations that makes it unsuited to cultivation and that restrict its use largely to grazing, woodland or wildlife.

Restrictions are caused by one or more continuing limitations that cannot be corrected, such as:

1. Very steep slopes
2. Erosion
3. Shallow soil
4. Stones
5. Wet soil
6. Salts or sodality
7. Unfavourable climate

The physical conditions of this land class are such that it is impractical to apply pasture or range improvements as seeding, liming and fertilizing. Depending on the soil characteristics and climate, land in Class VII may be well or poorly suited to woodland. In unusual instances, some occurrences may be used for special crops under unusual management practices.

Based on the above information, (the very low annual rainfall and the high average temperatures) it is clear that the agricultural potential of the soils in the study area is low. The soils are only suited to sustain limited grazing, such as sheep farming.

10 CONCLUSIONS AND RECOMMENDATIONS

10.1 The general soil profile on the sites can be described as a layer of loose sand underlain by layers of hard, calcareous pedogenic material. The pedogenic material disintegrates into coarse gravel during excavation.

10.2 The soil pH is expected to range between 6.4 and 6.9. The soils are therefore very slightly corrosive. Conventional galvanising will be sufficient for long term corrosion protection of critical elements in contact with the soil.

10.3 The use of ground screws as foundation system for the photovoltaic cells might not be feasible for the Sites B & C due to the shallow weathered rock encountered. The specialist contractor responsible for the design and installation of the screws will however need to confirm the soil suitability with appropriate onsite tests prior to installation of the screws.

10.4 The risk of flooding of the sites is very low.

10.5 The risk of seismic movement that could cause damage to structures is low.

10.6 The agricultural potential of the site is low, mainly due to the harsh climate, shallow soils and low annual rainfall.

10.7 No significant geotechnical constraints were identified in the study that could negatively affect the proposed development. The site is therefore suited for the development of a solar power facility.

MPJ Loubser Pr Eng
For SKCM Engineers

Annexure A – Trial Pit Profile Descriptions

PROFILE NO :	TP 1	DATE	2018/09/04	PROFILED BY:	ML
LATITUDE :	29°26'12" S	LONGITUDE :	20°53'07"E	ELEVATION (m)	916
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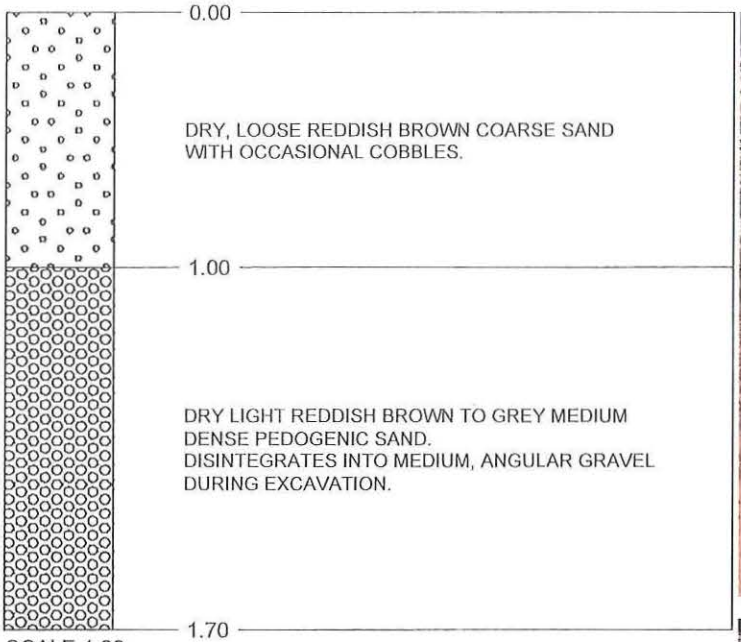

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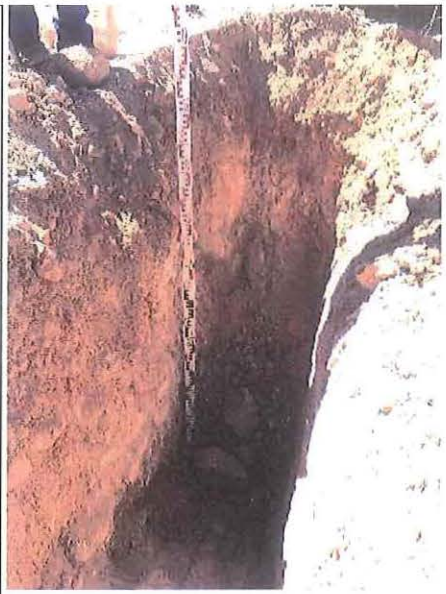

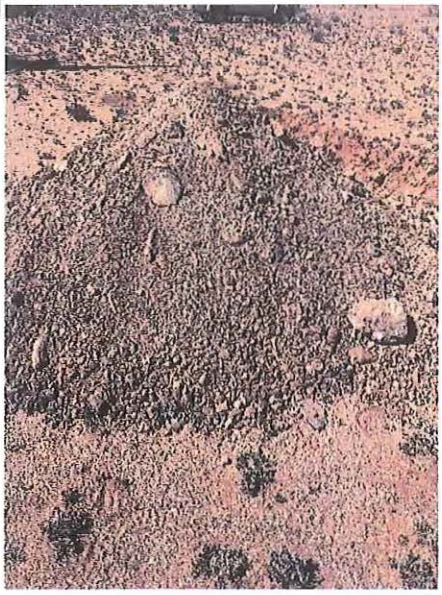

NOTES:

1. NO SEEPAGE OR WATER TABLE ENCOUNTERED

SOIL TEXTURE	
GRAIN SIZE (mm)	CLASIFICATION
<0.5	MEDIUM SAND
0.5 - 2.0	COARSE SAND
2.0 - 6.0	FINE GRAVEL
6.0 - 20.0	MEDIUM GRAVEL
20.0 - 60.0	COARSE GRAVEL
60.0 - 200	COBBLES
>200	BOULDERS

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TITLE: PROPOSED SOLAR POWER FACILITY PORTION 7

CLIENT: WINE ESTATE CAPITAL MANAGEMENT South Africa

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DESIGNED	ML	2018/09/04	
DRAWN	M.dB	2018/09/04	
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NOTE:

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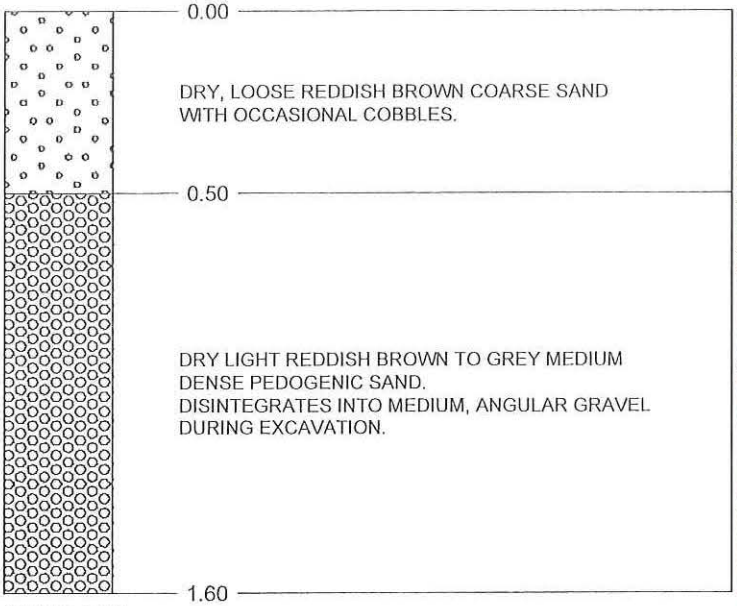

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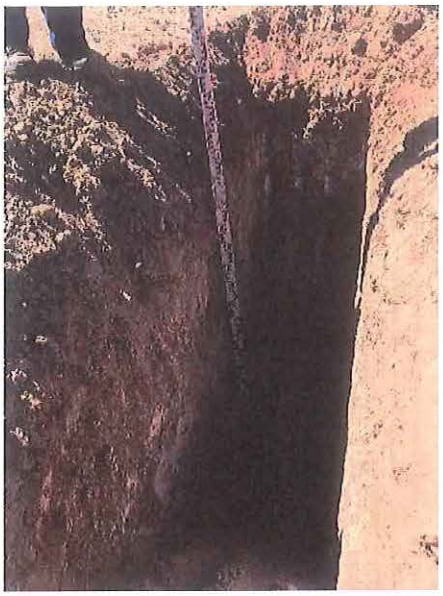

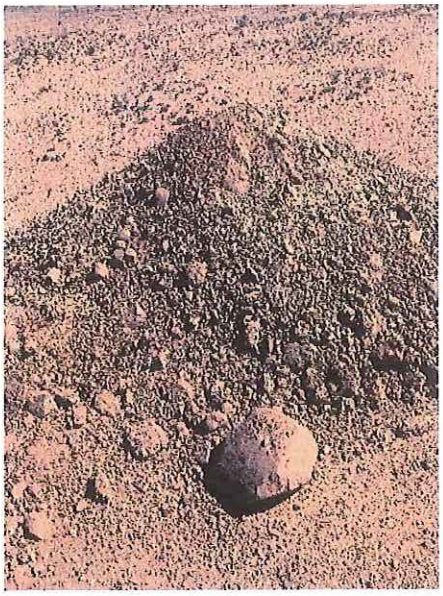

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GRAIN SIZE (mm)	CLASIFICATION
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0.5 - 2.0	COARSE SAND
2.0 - 6.0	FINE GRAVEL
6.0 - 20.0	MEDIUM GRAVEL
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60.0 - 200	COBBLES
>200	BOULDERS

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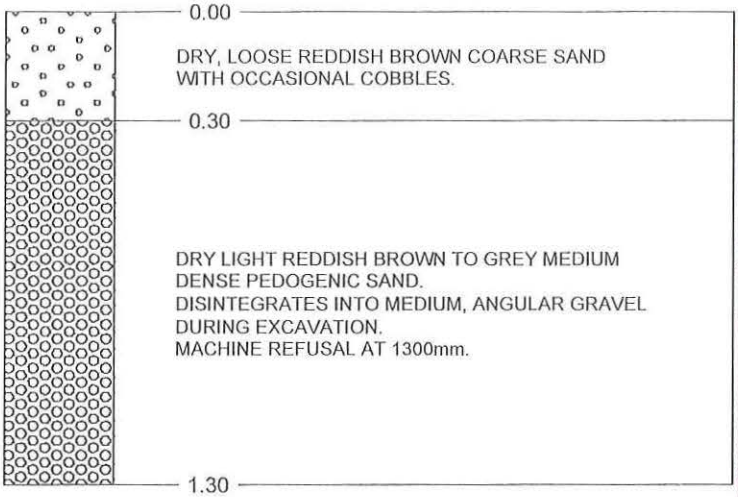

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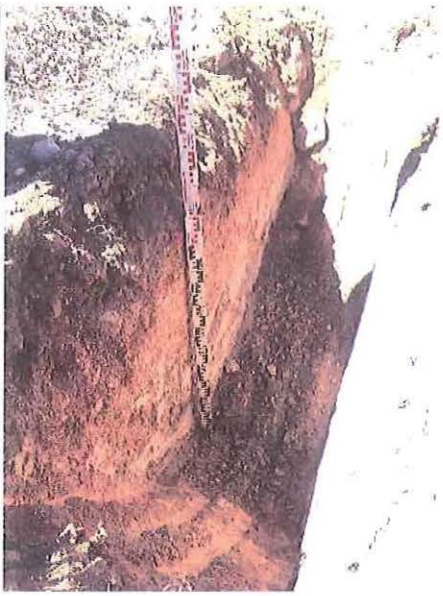

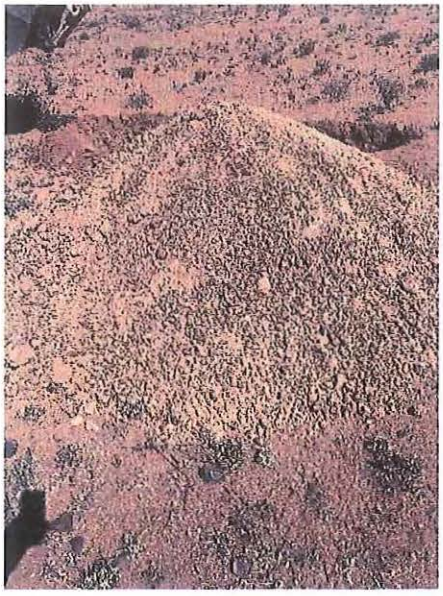

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SOIL TEXTURE	
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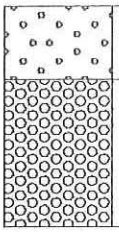

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DRY, LOOSE REDDISH BROWN COARSE SAND WITH OCCASIONAL COBBLES.

0.20

DRY LIGHT REDDISH BROWN TO GREY MEDIUM DENSE PEDOGENIC SAND.
DISINTEGRATES INTO MEDIUM, ANGULAR GRAVEL DURING EXCAVATION.
MACHINE REFUSAL AT 300mm.

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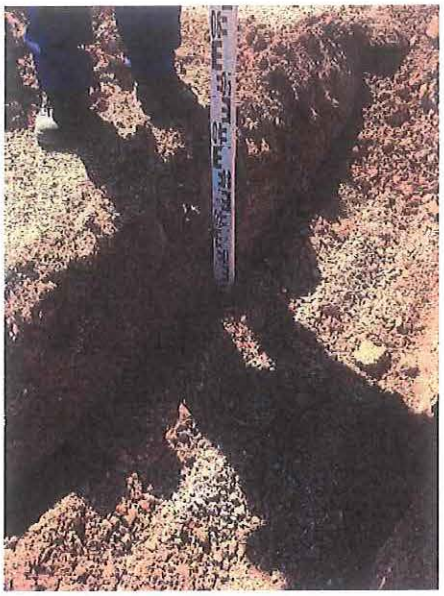

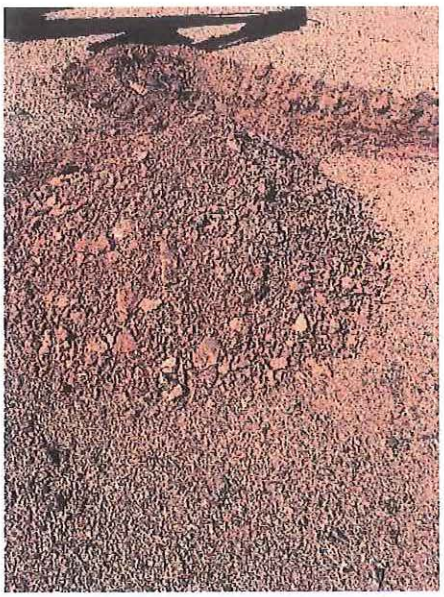

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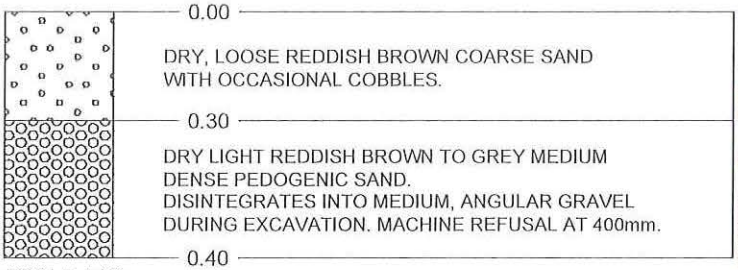
NOTE:

PROFILE NO :	TP 5	DATE	2018/09/04	PROFILED BY:	ML
LATITUDE :	29°26'31"S	LONGITUDE :	20°52'10"E	ELEVATION (m)	910
DEPTH OF PROFILE PIT (m)		DEPTH OF WATER TABLE		DEPTH TO WEATHERED ROCK	
0.3		UNKNOWN		0.4 m	



0.00

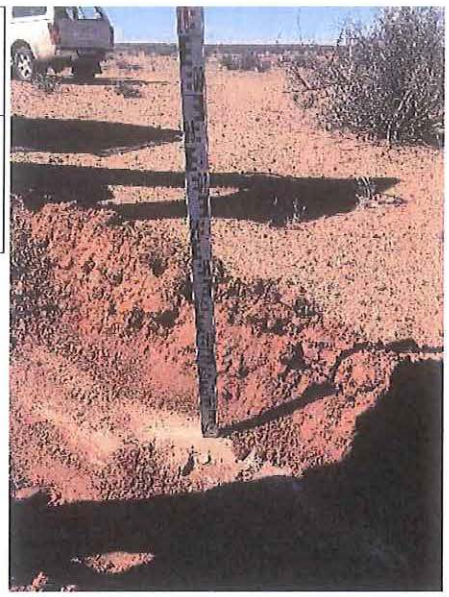
DRY, LOOSE REDDISH BROWN COARSE SAND WITH OCCASIONAL COBBLES.

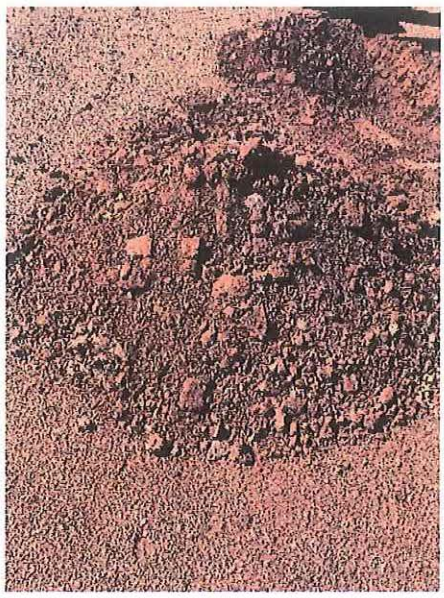
0.30

DRY LIGHT REDDISH BROWN TO GREY MEDIUM DENSE PEDOGENIC SAND.
DISINTEGRATES INTO MEDIUM, ANGULAR GRAVEL DURING EXCAVATION. MACHINE REFUSAL AT 400mm.

0.40

SCALE 1:20





NOTES:

1. NO SEEPAGE OR WATER TABLE ENCOUNTERED

SOIL TEXTURE	
GRAIN SIZE (mm)	CLASIFICATION
<0.5	MEDIUM SAND
0.5 - 2.0	COARSE SAND
2.0 - 6.0	FINE GRAVEL
6.0 - 20.0	MEDIUM GRAVEL
20.0 - 60.0	COARSE GRAVEL
60.0 - 200	COBBLES
>200	BOULDERS

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eMail: skcmsouth@skcm.co.za

TITLE: PROPOSED SOLAR POWER FACILITY PORTION 7

CLIENT: WINE ESTATE CAPITAL MANAGEMENT South Africa

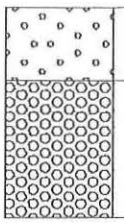
	BY	DATE	CH
DESIGNED	ML	2018/09/04	
DRAWN	M.dB	2018/09/04	
TRACED			

SCALE : 1:20

DRAWING NO.: W1484 - TP 5

REVISION: 0

PROFILE NO :	TP 6	DATE	2018/09/04	PROFILED BY:	ML
LATITUDE :	29°26'31"S	LONGITUDE :	20°52'25"E	ELEVATION (m)	915
DEPTH OF PROFILE PIT (m)		DEPTH OF WATER TABLE		DEPTH TO WEATHERED ROCK	
0.25		UNKNOWN		0.25 m	



0.00

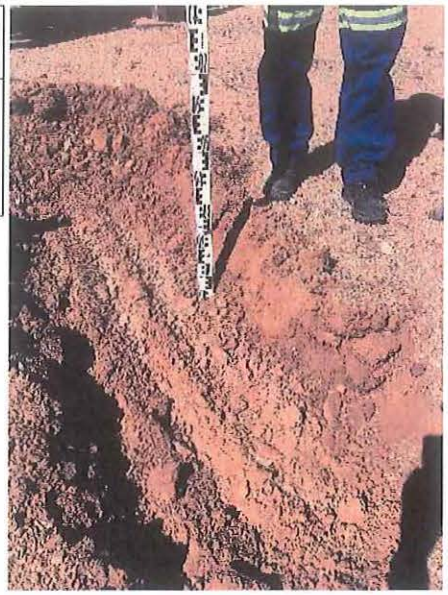
DRY, LOOSE REDDISH BROWN COARSE SAND WITH OCCASIONAL COBBLES.

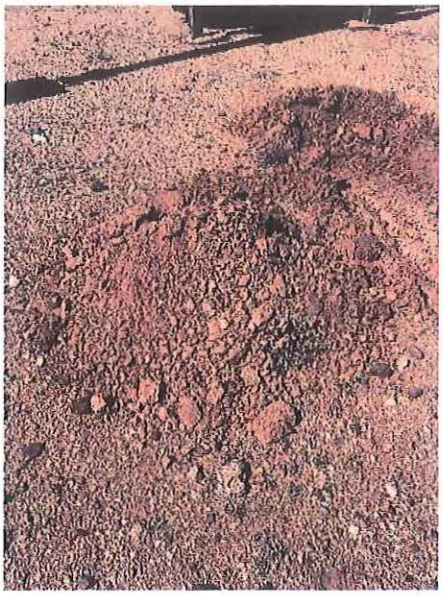
0.20

DRY LIGHT REDDISH BROWN TO GREY MEDIUM DENSE PEDOGENIC SAND.
DISINTEGRATES INTO MEDIUM, ANGULAR GRAVEL DURING EXCAVATION. MACHINE REFUSAL AT 250mm.

0.25

SCALE 1:20





NOTES:

1. NO SEEPAGE OR WATER TABLE ENCOUNTERED

SOIL TEXTURE	
GRAIN SIZE (mm)	CLASIFICATION
<0.5	MEDIUM SAND
0.5 - 2.0	COARSE SAND
2.0 - 6.0	FINE GRAVEL
6.0 - 20.0	MEDIUM GRAVEL
20.0 - 60.0	COARSE GRAVEL
60.0 - 200	COBBLES
>200	BOULDERS

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TITLE: PROPOSED SOLAR POWER FACILITY PORTION 7

CLIENT: WINE ESTATE CAPITAL MANAGEMENT SOUTH AFRICA

	BY	DATE	CH
DESIGNED	ML	2018/09/04	
DRAWN	M.dB	2018/09/04	
TRACED			

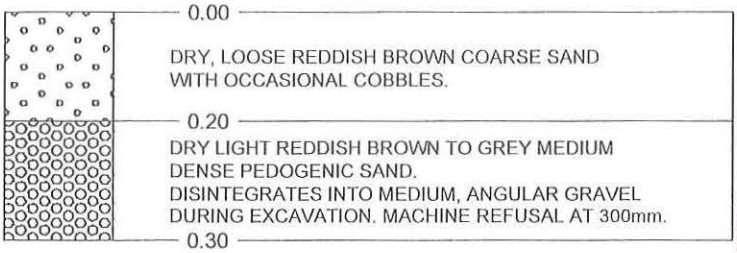
SCALE : 1:20

DRAWING NO.: W1484 - TP 6

REVISION: 0

NOTE:

PROFILE NO :	TP 7	DATE	2018/09/04	PROFILED BY:	ML
LATITUDE :	29°26'28"S	LONGITUDE :	20°52'41"E	ELEVATION (m)	919
DEPTH OF PROFILE PIT (m)		DEPTH OF WATER TABLE		DEPTH TO WEATHERED ROCK	
0.30		UNKNOWN		0.3 m	



0.00

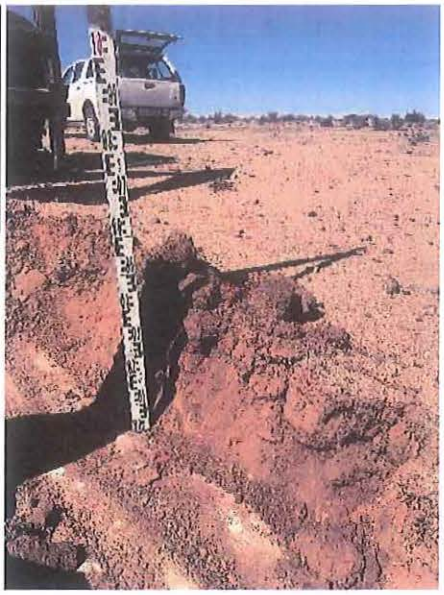
DRY, LOOSE REDDISH BROWN COARSE SAND WITH OCCASIONAL COBBLES.

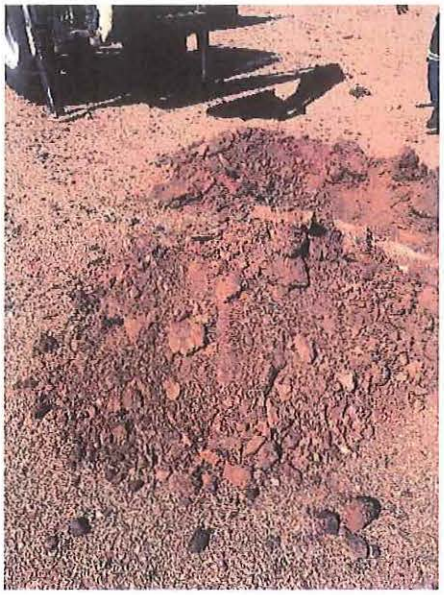
0.20

DRY LIGHT REDDISH BROWN TO GREY MEDIUM DENSE PEDOGENIC SAND.
DISINTEGRATES INTO MEDIUM, ANGULAR GRAVEL DURING EXCAVATION. MACHINE REFUSAL AT 300mm.

0.30

SCALE 1:20





NOTES:

1. NO SEEPAGE OR WATER TABLE ENCOUNTERED

SOIL TEXTURE	
GRAIN SIZE (mm)	CLASIFICATION
<0.5	MEDIUM SAND
0.5 - 2.0	COARSE SAND
2.0 - 6.0	FINE GRAVEL
6.0 - 20.0	MEDIUM GRAVEL
20.0 - 60.0	COARSE GRAVEL
60.0 - 200	COBBLES
>200	BOULDERS

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TITLE: PROPOSED SOLAR POWER FACILITY PORTION 7

CLIENT: WINE ESTATE CAPITAL MANAGEMENT South Africa

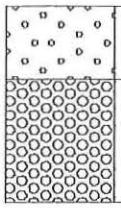
	BY	DATE	CH
DESIGNED	ML	2018/09/04	
DRAWN	M.dB	2018/09/04	
TRACED			

SCALE : 1:20

DRAWING NO.: W1484 - TP 7

REVISION: 0

PROFILE NO :	TP 8	DATE	2018/09/04	PROFILED BY:	ML
LATITUDE :	29°26'34"S	LONGITUDE :	20°52'47"E	ELEVATION (m)	922
DEPTH OF PROFILE PIT (m)		DEPTH OF WATER TABLE		DEPTH TO WEATHERED ROCK	
0.20		UNKNOWN		0.25 m	



0.00

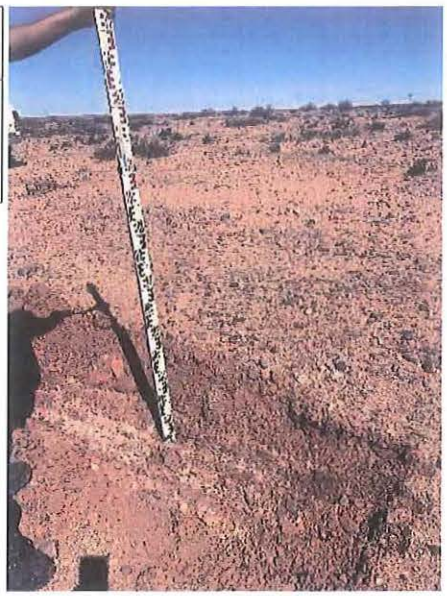
DRY, LOOSE REDDISH BROWN COARSE SAND WITH OCCASIONAL COBBLES.

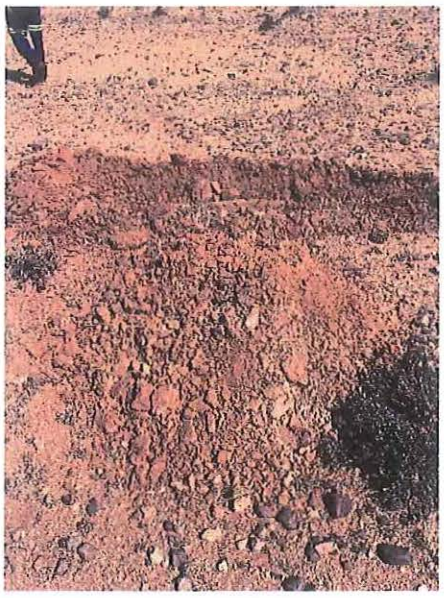
0.20

DRY LIGHT REDDISH BROWN TO GREY MEDIUM DENSE PEDOGENIC SAND.
DISINTEGRATES INTO MEDIUM, ANGULAR GRAVEL DURING EXCAVATION. MACHINE REFUSAL AT 250mm.

0.25

SCALE 1:20





NOTES:

1. NO SEEPAGE OR WATER TABLE ENCOUNTERED

SOIL TEXTURE	
GRAIN SIZE (mm)	CLASIFICATION
<0.5	MEDIUM SAND
0.5 - 2.0	COARSE SAND
2.0 - 6.0	FINE GRAVEL
6.0 - 20.0	MEDIUM GRAVEL
20.0 - 60.0	COARSE GRAVEL
60.0 - 200	COBBLES
>200	BOULDERS

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TITLE: PROPOSED SOLAR POWER FACILITY PORTION 7

CLIENT: WINE ESTATE CAPITAL MANAGEMENT SOUTH AFRICA

	BY	DATE	CH
DESIGNED	ML	2018/09/04	
DRAWN	M.dB	2018/09/04	
TRACED			

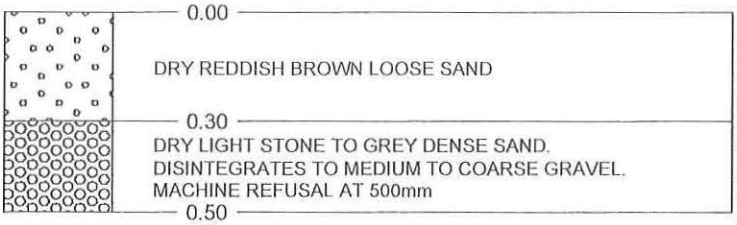
SCALE : 1:20

DRAWING NO.: W1484 - TP 8

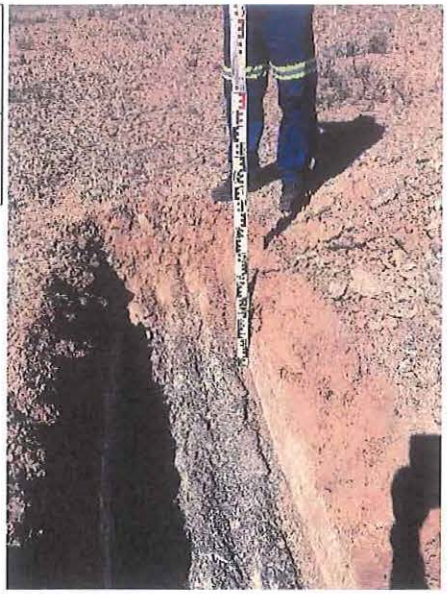
REVISION: 0

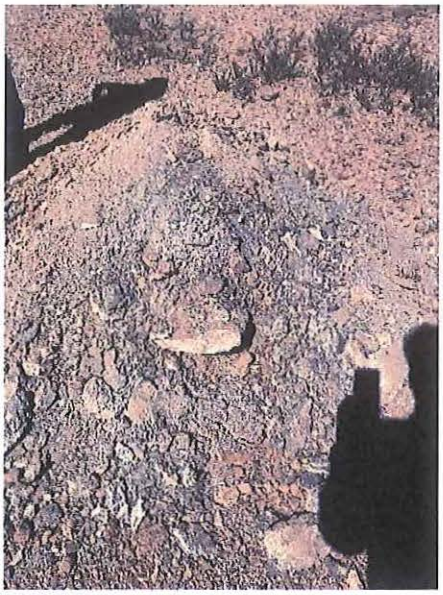
NOTE:

PROFILE NO :	TP 9	DATE	2018/09/04	PROFILED BY:	ML
LATITUDE :	29°26'28"S	LONGITUDE :	20°51'49"E	ELEVATION (m)	910
DEPTH OF PROFILE PIT (m)		DEPTH OF WATER TABLE		DEPTH TO WEATHERED ROCK	
0.50		UNKNOWN		0.5 m	



SCALE 1:20





NOTES:

1. NO SEEPAGE OR WATER TABLE ENCOUNTERED

SOIL TEXTURE	
GRAIN SIZE (mm)	CLASIFICATION
<0.5	MEDIUM SAND
0.5 - 2.0	COARSE SAND
2.0 - 6.0	FINE GRAVEL
6.0 - 20.0	MEDIUM GRAVEL
20.0 - 60.0	COARSE GRAVEL
60.0 - 200	COBBLES
>200	BOULDERS

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TITLE: PROPOSED SOLAR POWER FACILITY PORTION 7

CLIENT: WINE ESTATE CAPITAL MANAGEMENT SOUTH AFRICA

	BY	DATE	CH
DESIGNED	ML	2018/09/04	
DRAWN	M.dB	2018/09/04	
TRACED			

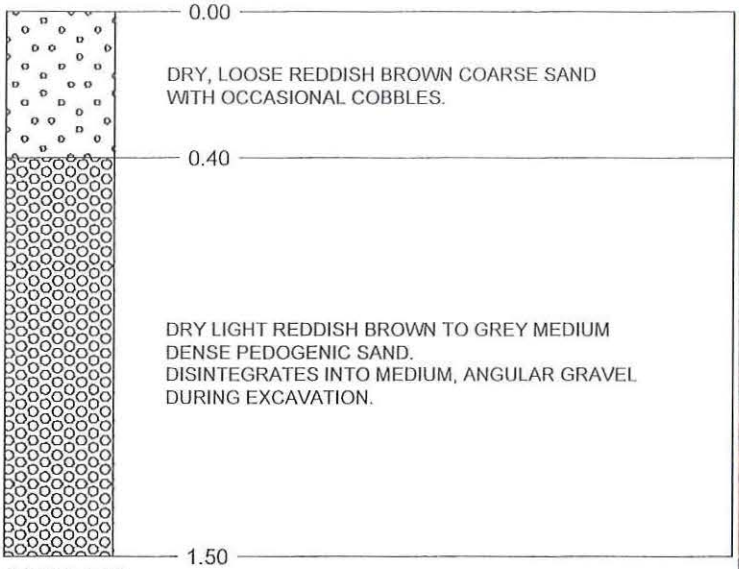
SCALE : 1:20

DRAWING NO.: W1484 - TP 9

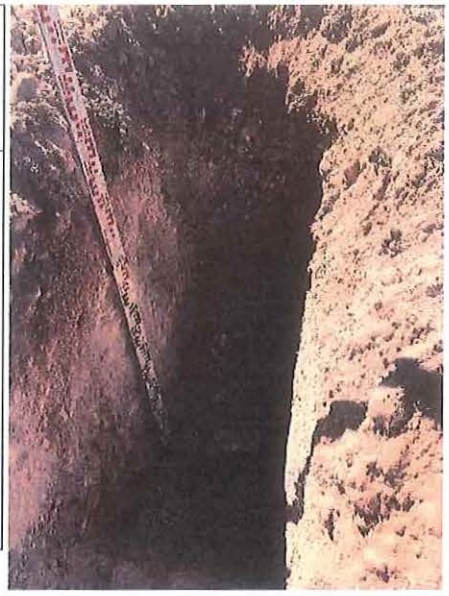
REVISION: 0

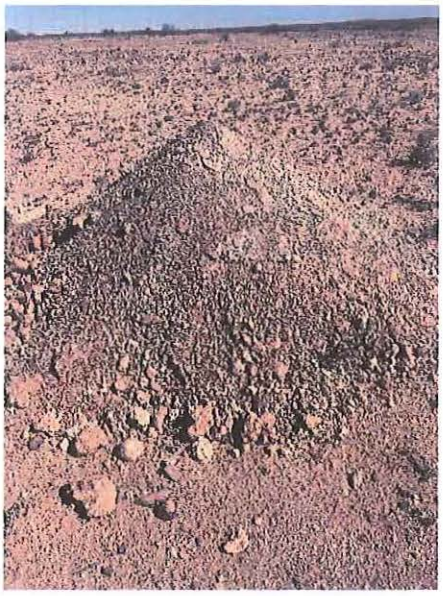
NOTE:

PROFILE NO :	TP 10	DATE	2018/09/04	PROFILED BY:	ML
LATITUDE :	29°26'21"S	LONGITUDE :	20°51'46"E	ELEVATION (m)	906
DEPTH OF PROFILE PIT (m)		DEPTH OF WATER TABLE		DEPTH TO WEATHERED ROCK	
1.5		UNKNOWN		UNKNOWN	



SCALE 1:20





NOTES:

1. NO SEEPAGE OR WATER TABLE ENCOUNTERED

SOIL TEXTURE	
GRAIN SIZE (mm)	CLASIFICATION
<0.5	MEDIUM SAND
0.5 - 2.0	COARSE SAND
2.0 - 6.0	FINE GRAVEL
6.0 - 20.0	MEDIUM GRAVEL
20.0 - 60.0	COARSE GRAVEL
60.0 - 200	COBBLES
>200	BOULDERS

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TITLE: PROPOSED SOLAR POWER FACILITY PORTION 7

CLIENT: WINE ESTATE CAPITAL MANAGEMENT South Africa

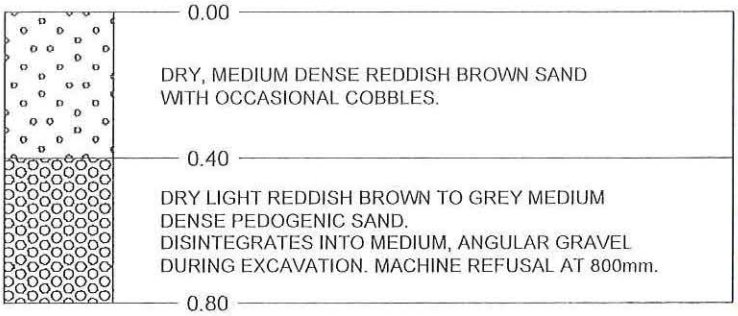
	BY	DATE	CH
DESIGNED	ML	2018/09/04	
DRAWN	M.dB	2018/09/04	
TRACED			

SCALE : 1:20

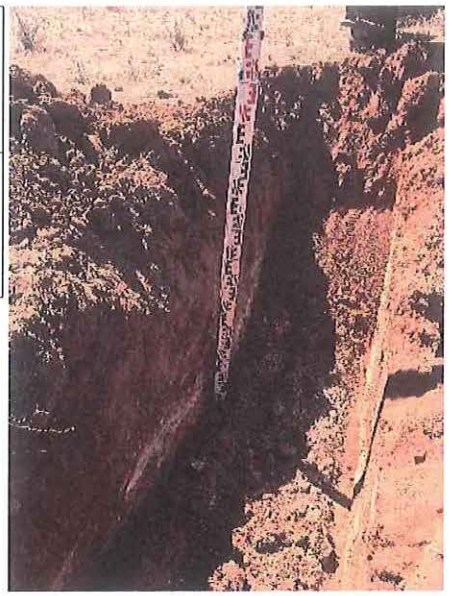
DRAWING NO.: W1484 - TP 10

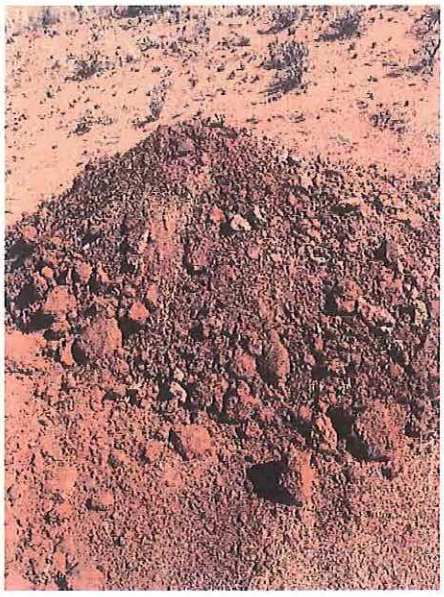
REVISION: 0

PROFILE NO :	TP 11	DATE	2018/09/04	PROFILED BY:	ML
LATITUDE :	29°26'08"S	LONGITUDE :	20°51'49"E	ELEVATION (m)	902
DEPTH OF PROFILE PIT (m)		DEPTH OF WATER TABLE		DEPTH TO WEATHERED ROCK	
0.8		UNKNOWN		0.8 m	



SCALE 1:20





NOTES:

1. NO SEEPAGE OR WATER TABLE ENCOUNTERED

SOIL TEXTURE	
GRAIN SIZE (mm)	CLASIFICATION
<0.5	MEDIUM SAND
0.5 - 2.0	COARSE SAND
2.0 - 6.0	FINE GRAVEL
6.0 - 20.0	MEDIUM GRAVEL
20.0 - 60.0	COARSE GRAVEL
60.0 - 200	COBBLES
>200	BOULDERS

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TITLE: PROPOSED SOLAR POWER FACILITY PORTION 7

CLIENT: WINE ESTATE CAPITAL MANAGEMENT South Africa

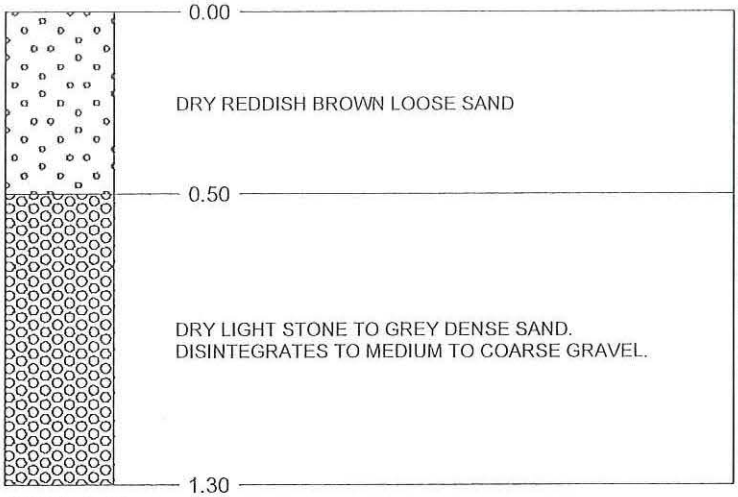
	BY	DATE	CH
DESIGNED	ML	2018/09/04	
DRAWN	M.dB	2018/09/04	
TRACED			

SCALE : 1:20

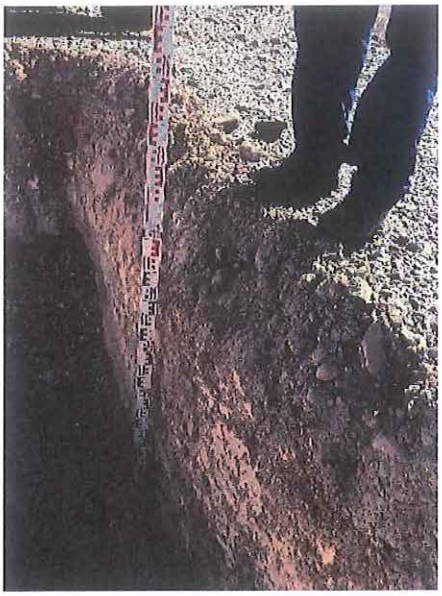
DRAWING NO.: W1484 - TP 11

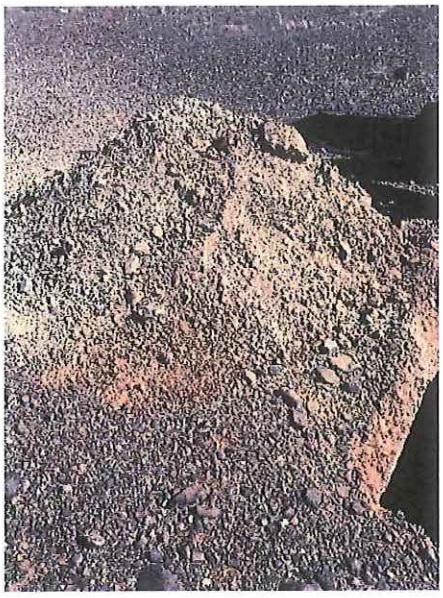
REVISION: 0

PROFILE NO :	TP 12	DATE	2018/09/04	PROFILED BY:	ML
LATITUDE :	29°27'11"S	LONGITUDE :	20°51'24"E	ELEVATION (m)	907
DEPTH OF PROFILE PIT (m)		DEPTH OF WATER TABLE		DEPTH TO WEATHERED ROCK	
1.30		UNKNOWN		UNKNOWN	



SCALE 1:20





NOTES:

1. NO SEEPAGE OR WATER TABLE ENCOUNTERED

SOIL TEXTURE	
GRAIN SIZE (mm)	CLASIFICATION
<0.5	MEDIUM SAND
0.5 - 2.0	COARSE SAND
2.0 - 6.0	FINE GRAVEL
6.0 - 20.0	MEDIUM GRAVEL
20.0 - 60.0	COARSE GRAVEL
60.0 - 200	COBBLES
>200	BOULDERS

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TITLE: PROPOSED SOLAR POWER FACILITY PORTION 7

CLIENT: WINE ESTATE CAPITAL MANAGEMENT SOUTH AFRICA

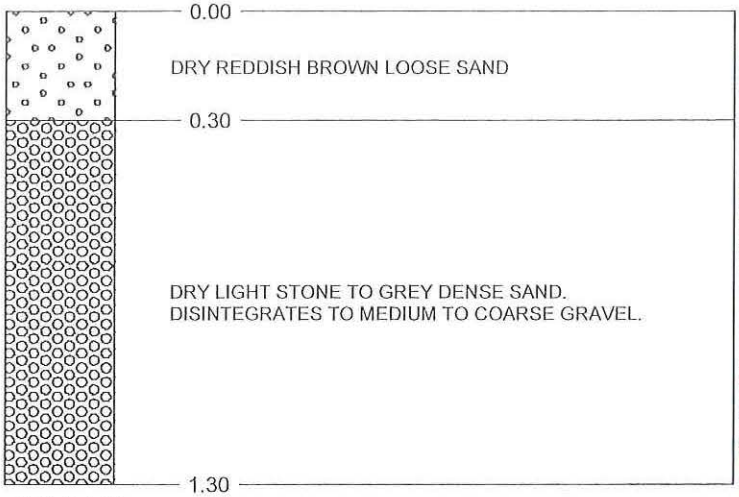
	BY	DATE	CH
DESIGNED	ML	2018/09/04	
DRAWN	M.dB	2018/09/04	
TRACED			

SCALE : 1:20

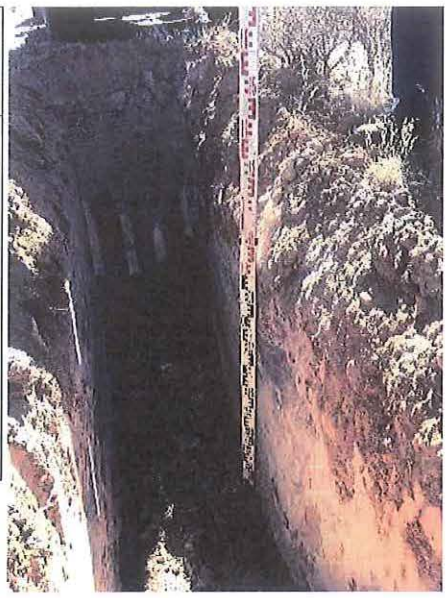
DRAWING NO.: W1484 - TP 12

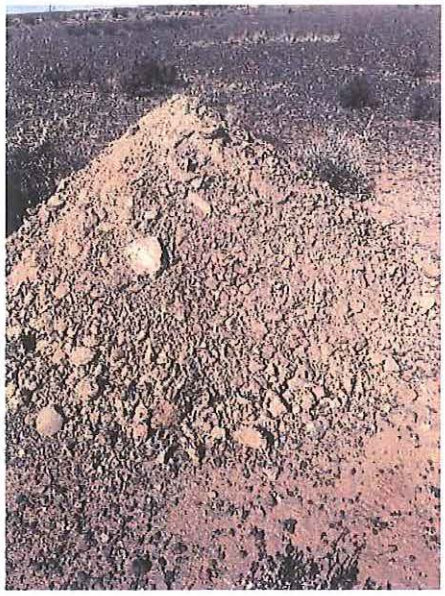
REVISION: 0

PROFILE NO :	TP 13	DATE	2018/09/04	PROFILED BY:	ML
LATITUDE :	29°27'11"S	LONGITUDE :	20°51'27"E	ELEVATION (m)	905
DEPTH OF PROFILE PIT (m)		DEPTH OF WATER TABLE		DEPTH TO WEATHERED ROCK	
1.30		UNKNOWN		UNKNOWN	



SCALE 1:20





NOTES:

1. NO SEEPAGE OR WATER TABLE ENCOUNTERED

SOIL TEXTURE	
GRAIN SIZE (mm)	CLASIFICATION
<0.5	MEDIUM SAND
0.5 - 2.0	COARSE SAND
2.0 - 6.0	FINE GRAVEL
6.0 - 20.0	MEDIUM GRAVEL
20.0 - 60.0	COARSE GRAVEL
60.0 - 200	COBBLES
>200	BOULDERS

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9B CHURCH STREET
P.O.BOX 63
MALMESBURY
7300
TEL: (022) 487 3017
eMail: skcmsouth@skcm.co.za

TITLE: PROPOSED SOLAR POWER FACILITY PORTION 7

CLIENT: WINE ESTATE CAPITAL MANAGEMENT South Africa

	BY	DATE	CH
DESIGNED	ML	2018/09/04	
DRAWN	M.dB	2018/09/04	
TRACED			

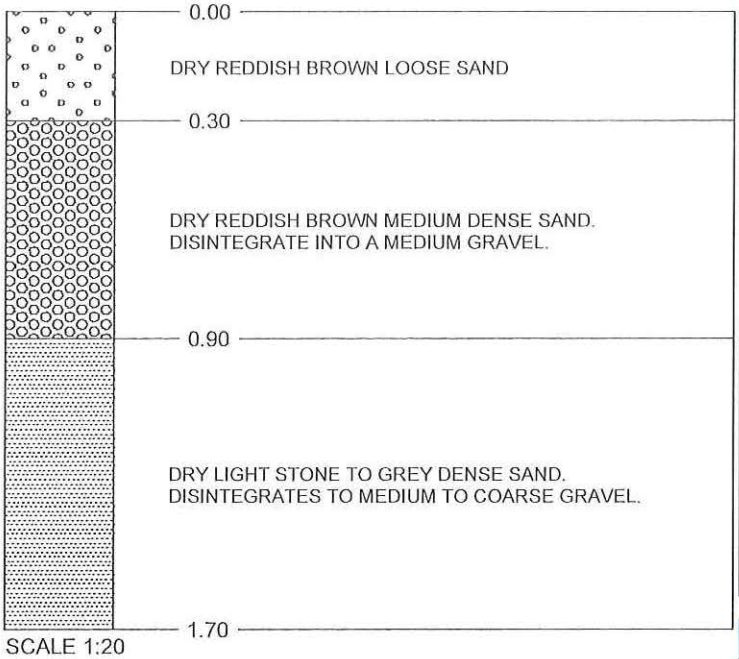
SCALE : 1:20

DRAWING NO.: W1484 - TP 13

REVISION: 0

NOTE:

PROFILE NO :	TP 14	DATE	2018/09/04	PROFILED BY:	ML
LATITUDE :	29°27'18"S	LONGITUDE :	20°51'07"E	ELEVATION (m)	905
DEPTH OF PROFILE PIT (m)		DEPTH OF WATER TABLE		DEPTH TO WEATHERED ROCK	
1.70		UNKNOWN		UNKNOWN	



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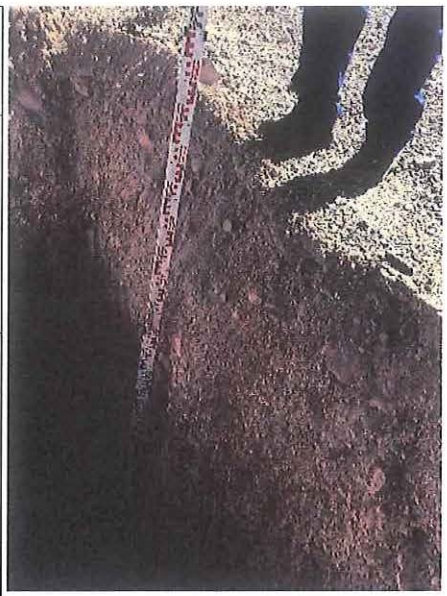

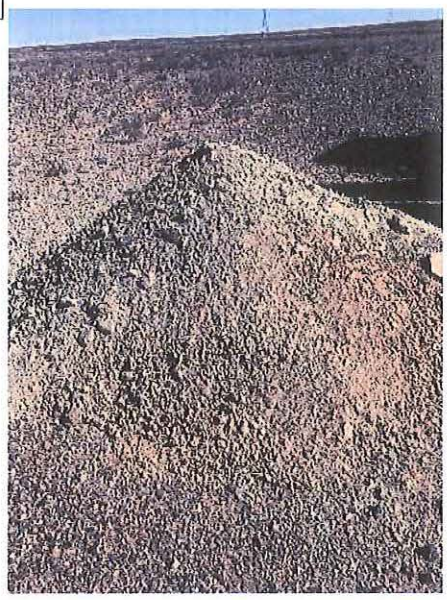

NOTES:

1. NO SEEPAGE OR WATER TABLE ENCOUNTERED

SOIL TEXTURE	
GRAIN SIZE (mm)	CLASIFICATION
<0.5	MEDIUM SAND
0.5 - 2.0	COARSE SAND
2.0 - 6.0	FINE GRAVEL
6.0 - 20.0	MEDIUM GRAVEL
20.0 - 60.0	COARSE GRAVEL
60.0 - 200	COBBLES
>200	BOULDERS

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MALMESBURY
7300
TEL: (022) 487 3017
eMail: skcmsouth@skcm.co.za

TITLE: PROPOSED SOLAR POWER FACILITY PORTION 7

CLIENT: WINE ESTATE CAPITAL MANAGEMENT SOUTH AFRICA

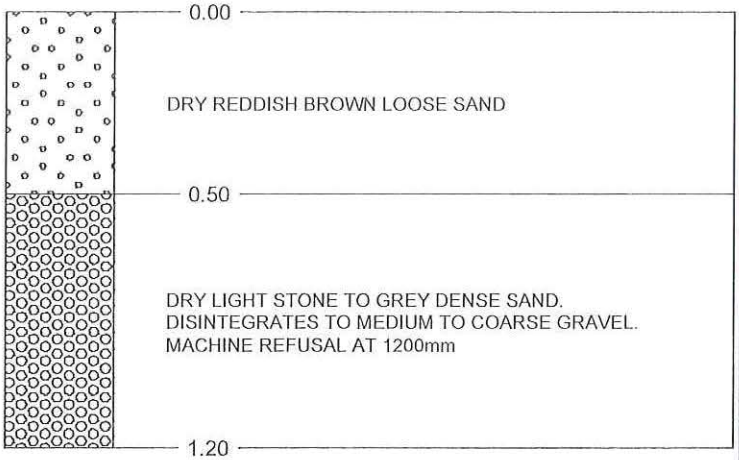
	BY	DATE	CH
DESIGNED	ML	2018/09/04	
DRAWN	M.dB	2018/09/04	
TRACED			

SCALE : 1:20

DRAWING NO.: W1484 - TP 14

REVISION: 0

PROFILE NO :	TP 15	DATE	2018/09/04	PROFILED BY:	ML
LATITUDE :	29°27'28"S	LONGITUDE :	20°51'01"E	ELEVATION (m)	905
DEPTH OF PROFILE PIT (m)		DEPTH OF WATER TABLE		DEPTH TO WEATHERED ROCK	
1.20		UNKNOWN		1.2 m	



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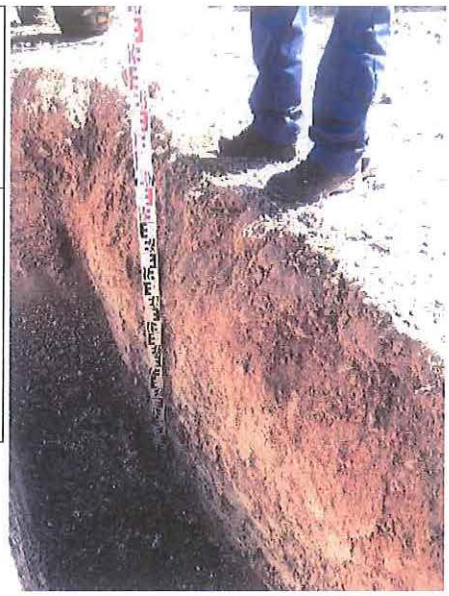

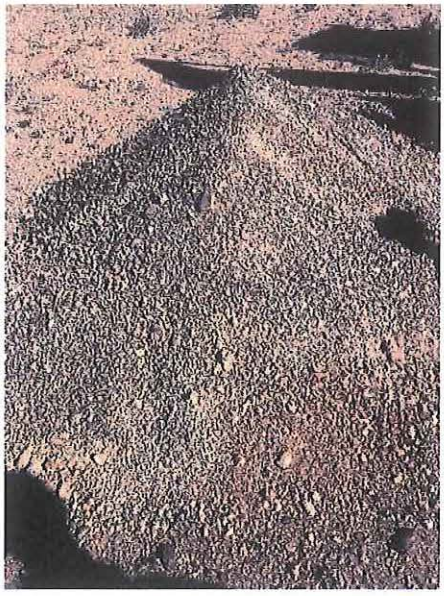

NOTES:

1. NO SEEPAGE OR WATER TABLE ENCOUNTERED

SOIL TEXTURE	
GRAIN SIZE (mm)	CLASIFICATION
<0.5	MEDIUM SAND
0.5 - 2.0	COARSE SAND
2.0 - 6.0	FINE GRAVEL
6.0 - 20.0	MEDIUM GRAVEL
20.0 - 60.0	COARSE GRAVEL
60.0 - 200	COBBLES
>200	BOULDERS

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eMail: skcmsouth@skcm.co.za

TITLE: PROPOSED SOLAR POWER FACILITY PORTION 7

CLIENT: WINE ESTATE CAPITAL MANAGEMENT South Africa

	BY	DATE	CH
DESIGNED	ML	2018/09/04	
DRAWN	M.dB	2018/09/04	
TRACED			

SCALE : 1:20

DRAWING NO.: W1484 - TP 15

REVISION: 0

Annexure B – Laboratory Test Results

0219816724

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a SANAS Accredited Testing Laboratory, No. T0245
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P.O BOX 1106 , BRACKENFELL
Tel. : 021 9816558
Fax : 021 9816724
Email : info@matrocast.co.za

TEST RESULTS

SKC ENGINEERS
P.O. BOX 229
PAARL
7620
Attention: MR M.LOUBSER

Project : SOLAR FARM , KENHARDT

Your Ref :
Our Ref : 46168
Date Reported : 29.11.2012

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(TMH1:A1-A5,A7,A8)

SAMPLE NO.	K 0161			
HOLE NO.	A + C1			
ROAD NO.	-			
DEPTH	-			
CHAINAGE	-			
LAYER TYPE	-			
STABILISED WITH	Neat			
SUPPLIER	-			
CURING METHOD	N/a			
DESCRIPTION	Dusky Mudstone & D/OI Weath.Granite			
SIEVE ANALYSIS (% PASSING)				
75 mm	100			
63 mm	94			
53 mm	94			
37.5 mm	90			
26.5 mm	87			
19.0 mm	83			
13.2 mm	80			
4.75 mm	55			
2.0 mm	32			
0.425 mm	13			
0.075 mm	4			
SOIL MORTAR				
COARSE SAND<2.000mm >0.425mm	59			
FINE SAND <0.425mm >0.075mm	28			
MATERIAL <0.075mm	13			
CONSTANTS				
GRADING MODULUS	2.51			
PRA CLASSIFICATION	A-1-a(0)			
UNIFIED SOIL CLAS.	SW			
COLTO CLASSIFICATION	G6			
TRH CLASSIFICATION	G7			
LIQUID LIMIT (%)	-			
PLASTICITY INDEX (0.425mm)	NP			
LINEAR SHRINKAGE (%)	0.0			
MOD AASHTO				
MAXIMUM DRY DENSITY (kg/m^3)	2066			
OPTIMUM MOISTURE CONTENT (%)	6.3			
MOULDING MOISTURE (%)	6.2			
TYPE OF TEST	CBR			
CBR-UCS @ 100% MOD AASHTO	71			
CBR-UCS @ 98% MOD AASHTO	63			
CBR-UCS @ 97% MOD AASHTO	46			
CBR-UCS @ 95% MOD AASHTO	36			
CBR-UCS @ 93% MOD AASHTO	32			
CBR-UCS @ 90% MOD AASHTO	27			

CBR-UCS @ % MOD AASHTO derived from calculation.

% SWELL AT [MOD][NRB][PROC]	0.00	0.00	0.00										

Remarks :

FORM: A1 3.3R (06.10.2010)

Technical Signatory : Raymond van Niekerk

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Email: info@matrocast.co.za

TEST RESULTS

SKC ENGINEERS
P.O. BOX 229
PAARL
7620
Attention: MR W.VOSLOO

Project : KENHARDT SOLAR ENERGY FARM

Your Ref :
Our Ref : 39630
Date Reported : 12.09.2011

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(TMH1:A1-A5)

SAMPLE NO.	E 0372	E 0373	E 0374	
HOLE NO.	TP 1	TP 1	TP 2	
ROAD NO.	-	-	-	
DEPTH	-	-	-	
CHAINAGE	Top	Middle	Bottom	
LAYER TYPE	-	-	-	
STABILISED WITH	Neat	Neat	Neat	
SUPPLIER	-	-	-	
CURING METHOD	N/a	N/a	N/a	
DESCRIPTION	Dark Yellow Orange Material	Olive Clayey Material	Dark Olive Clayey Material	
SIEVE ANALYSIS (% PASSING)				
75 mm	100			
63 mm	90			
53 mm	90		100	
37.5 mm	88	100	98	
26.5 mm	86	99	97	
19.0 mm	83	98	95	
13.2 mm	78	96	95	
4.75 mm	62	83	82	
2.0 mm	53	70	68	
0.425 mm	41	52	49	
0.075 mm	21	42	44	
SOIL MORTAR				
COARSE SAND<2.000mm >0.425mm	23	26	28	
FINE SAND <0.425mm >0.075mm	38	14	7	
MATERIAL <0.075mm	39	60	65	
CONSTANTS				
GRADING MODULUS	1.85	1.36	1.39	
PRA CLASSIFICATION	A-2-4(0)	A-7-6(4)	A-7-6(4)	
UNIFIED SOIL CLAS.	SC	SC	SM	
LIQUID LIMIT (%)	23	43	42	
PLASTICITY INDEX (0.425mm)	9	20	16	
LINEAR SHRINKAGE (%)	4.5	9.5	7.5	

Remarks : SAMPLED AND DELIVERED BY CUSTOMER

Technical Signatory : Gregory Bell

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TEST RESULTS

SKC ENGINEERS
P.O. BOX 229
PAARL
7620
Attention: MR W.VOSLOO

Project : KENHARDT SOLAR ENERGY FARM

Your Ref :
Our Ref : 39630.1
Date Reported : 12.09.2011

SIEVE ANALYSIS, ATTERBERG LIMITS, CBR, UCS(TMH1:A1-A5)

SAMPLE NO.	E 0395	E 0396	E 0397	
HOLE NO.	TP 1	TP 2	TP 4	
ROAD NO.	-	-	-	
DEPTH	1.6m	2.0m	1.3m	
CHAINAGE	100 MW	100 MW	100 MW	
LAYER TYPE	-	-	-	
STABILISED WITH	Neat	Neat	Neat	
SUPPLIER	-	-	-	
CURING METHOD	N/a	N/a	N/a	
DESCRIPTION	Dark Red Brown Material	Dark Red Brown Material	Dark Olive Material	
SIEVE ANALYSIS (% PASSING)				
75 mm				
63 mm	100		100	
53 mm	96		98	
37.5 mm	94	100	96	
26.5 mm	91	98	85	
19.0 mm	85	85	77	
13.2 mm	74	78	69	
4.75 mm	56	52	49	
2.0 mm	44	38	37	
0.425 mm	33	26	25	
0.075 mm	21	18	11	
SOIL MORTAR				
COARSE SAND<2.000mm >0.425mm	25	32	32	
FINE SAND <0.425mm >0.075mm	27	21	38	
MATERIAL <0.075mm	48	47	30	
CONSTANTS				
GRADING MODULUS	2.02	2.18	2.27	
PRA CLASSIFICATION	A-1-b(0)	A-2-4(0)	A-1-a(0)	
UNIFIED SOIL CLAS.	SC	SM-SC	GW-GC	
LIQUID LIMIT (%)	-	20	-	
PLASTICITY INDEX (0.425mm)	SP	7	NP	
LINEAR SHRINKAGE (%)	0.5	4.0	0.0	

Remarks : SAMPLED AND DELIVERED BY CUSTOMER

FORM: A1 3.3R (06.10.2010)

Technical Signatory : Gregory Bell

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Email: info@matrocast.co.za

sanas Testing Laboratory

TEST RESULTS

SKC ENGINEERS
P.O. BOX 229
PAARL
7620
Attention: MR W.VOSLOO

Project : KENHARDT SOLAR ENERGY FARM

Your Ref :
Our Ref : 39630
Date Reported : 13.09.2011

pH TEST RESULTS : METHOD A20

Lab.No.	Customer	Material		Average			
	Mark	Description		pH			
E 0372	TP 1	D/Y/Or		6.8			
	(Top)	Material					
E 0373	TP 1	Ol Clayey		6.4			
	(Middle)	Material					
E 0374	TP 2	D/Ol Clayey		6.7			
	(Bottom)	Material					
E 0395	TP 1 / 1.6	D/R/Br Material		6.9			
E 0396	TP 2 / 2.0	D/R/Br Material		6.4			
E 0397	TP 4 / 1.3	D/Ol Material		6.7			

Remarks :

FORM: C1 3.3R (06.10.2010)

Technical Signatory : Gregory Bell

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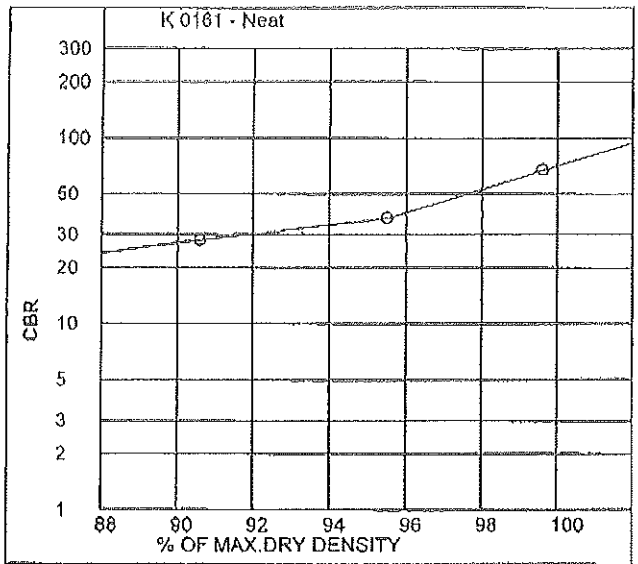
TEST RESULTS

SKC ENGINEERS
P.O. BOX 229
PAARL
7620
Attention: MR M.LOUBSER

Project : SOLAR FARM , KENHARDT

Your Ref :
Our Ref : 46168
Date Reported : 29.11.2012

CBR-UCS GRAPH/S (OPTIONAL INFORMATION)



	PROC	NRB	MOD
COMPACTION (%)	90.6	96.5	99.6
CBR	28	37	67

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TEST RESULTS

SKC ENGINEERS
P.O. BOX 229
PAARL
7620
Attention: MR M.LOUBSER

Project : SOLAR FARM , KENHARDT

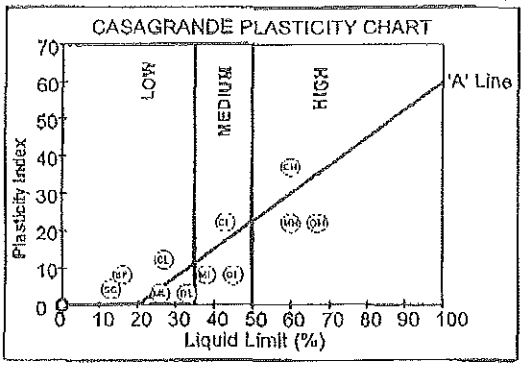
Your Ref :
Our Ref : 46166
Date Reported : 28.11.2012

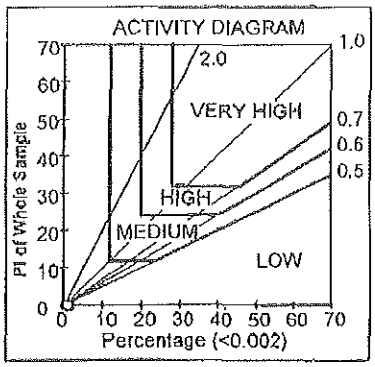
FOUNDATION INDICATOR (ASTM: D422)

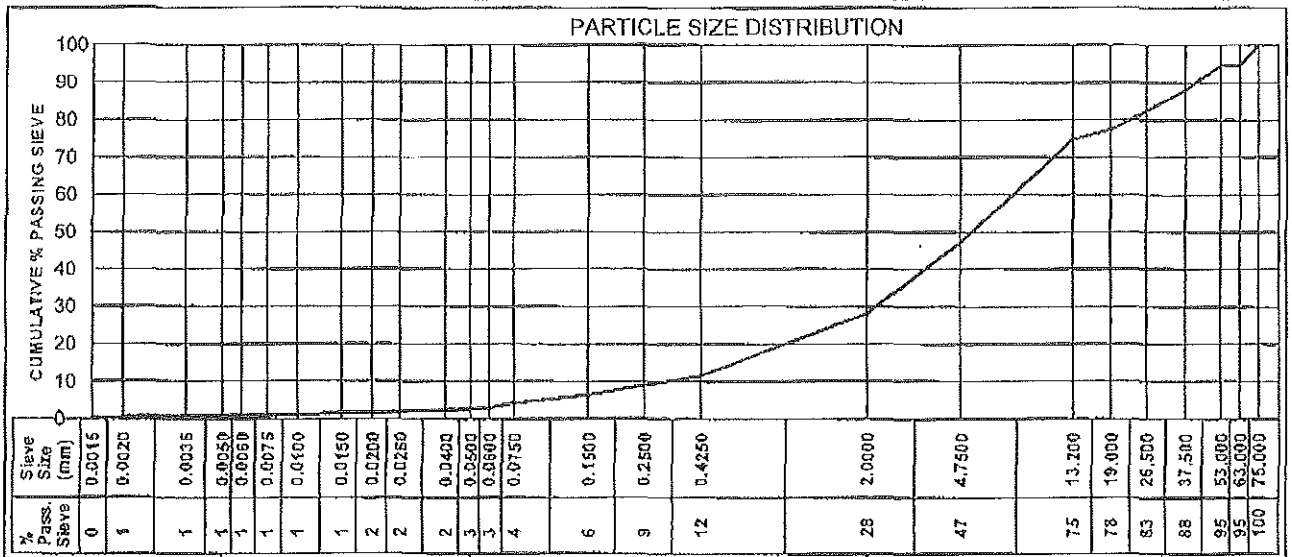
Sample No.	: K 0155
Hole No.	: A
Depth	: -
Liquid Limit (%)	: -
Plasticity Index	: SP
Linear Shrinkage (%)	: 0.5
PI of Whole Sample	: 0
P.R.A. Classification	: A-1-a(0)
Unified Soil Classification	: GW
Activity	: 0.00
Heave Classification	: LOW
Grading Modulus	: 2.56
Percentage (<0.002)	: 1.0
Moisture Content (%)	: 1.8

Material Description : DUSKY GREEN

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jonnings	1.1	1.6	25.6	71.8	SAND
Astm	1.1	3.1	43.1	52.7	SAND
British Standard	0.6	2.2	25.4	71.8	SAND







Sieve Size (mm)	0.0015	0.0020	0.0035	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0250	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	0	1	1	1	1	1	1	1	2	2	2	3	3	4	6	9	12	28	47	75	78	83	88	95	95	100

JENN CLAY	SILT	SAND	GRAVEL	
ASTM CLAY	SILT	FINE SAND	MEDIUM SAND	COARSE SAND / GRAVEL
BS CLAY / FINE SILT	MEDIUM SILT / COARSE SILT	FINE SAND / MEDIUM SAND / COARSE SAND	FINE GRAVEL / MEDIUM GRAVEL / COARSE GRAVEL	

Remarks : SAMPLED AND DELIVERED BY CUSTOMER

FORM: A6 3.3R (06.10.2010)

Technical Signatory : Raymond van Niekerk

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TEST RESULTS

SKC ENGINEERS
P.O. BOX 229
PAARL
7620
Attention: MR M.LOUBSER

Project : SOLAR FARM , KENHARDT

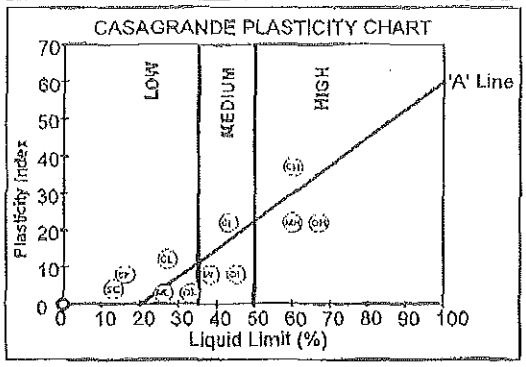
Your Ref :
Our Ref : 46168
Date Reported : 28.11.2012

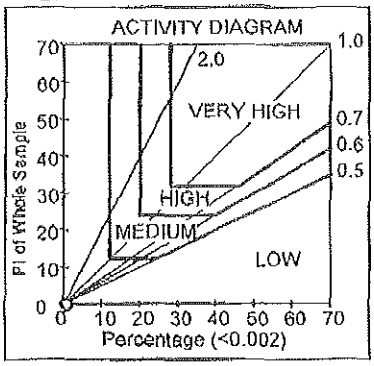
FOUNDATION INDICATOR (ASTM: D422)

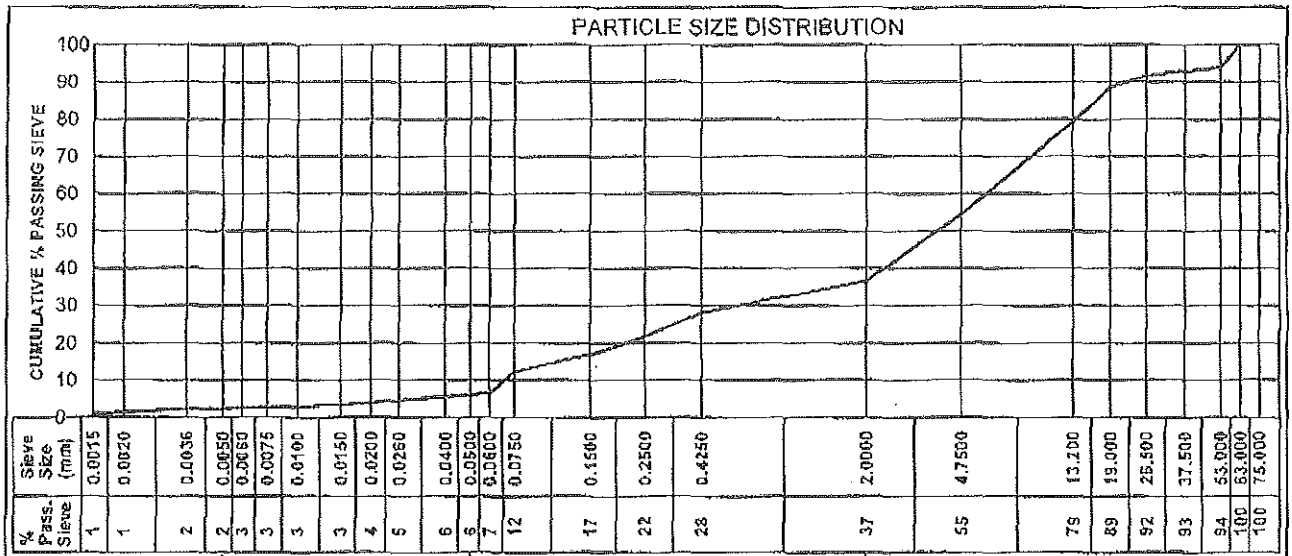
Sample No.	: K 0166
Hole No.	: B
Depth	: -
Liquid Limit (%)	: -
Plasticity Index	: SP
Linear Shrinkage (%)	: 0.6
PI of Whole Sample	: 0
P.R.A. Classification	: A-1-a(0)
Unified Soil Classification	: SW-SC
Activity	: 0.00
Heave Classification	: LOW
Grading Modulus	: 2.23
Percentage (<0.002)	: 1.0
Moisture Content (%)	: 3.3

Material Description : DARK BROWN

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	2.5	3.7	30.5	63.3	SAND
Astm	2.5	9.9	42.3	45.4	SILTY SAND
British Standard	1.4	5.2	30.1	63.3	SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0250	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	1	1	2	2	3	3	3	3	4	5	6	6	7	12	17	22	28	37	55	79	89	92	93	94	100	100

JENN	CLAY		SILT		SAND			GRAVEL		
ASTM	CLAY		SILT			FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks : SAMPLED AND DELIVERED BY CUSTOMER

FORM: A6 3.3R (06.10.2010)

Technical Signatory : Raymond van Niekerk

0219816724

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Tel. : 021 9815558
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TEST RESULTS

SKC ENGINEERS
P.O. BOX 229
PAARL
7620
Attention: MR M.LOUBSER

Project : SOLAR FARM , KENHARDT

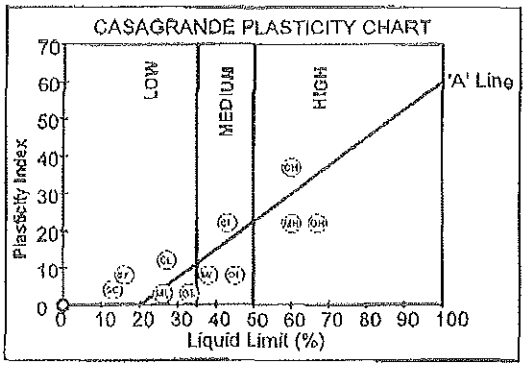
Your Ref :
Our Ref : 46168
Date Reported : 28.11.2012

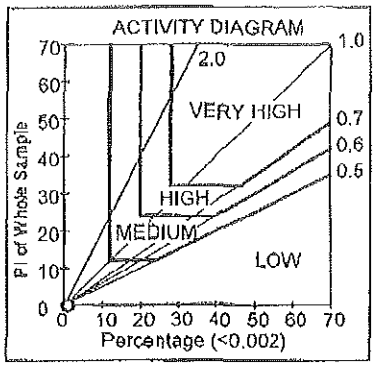
FOUNDATION INDICATOR (ASTM: D422)

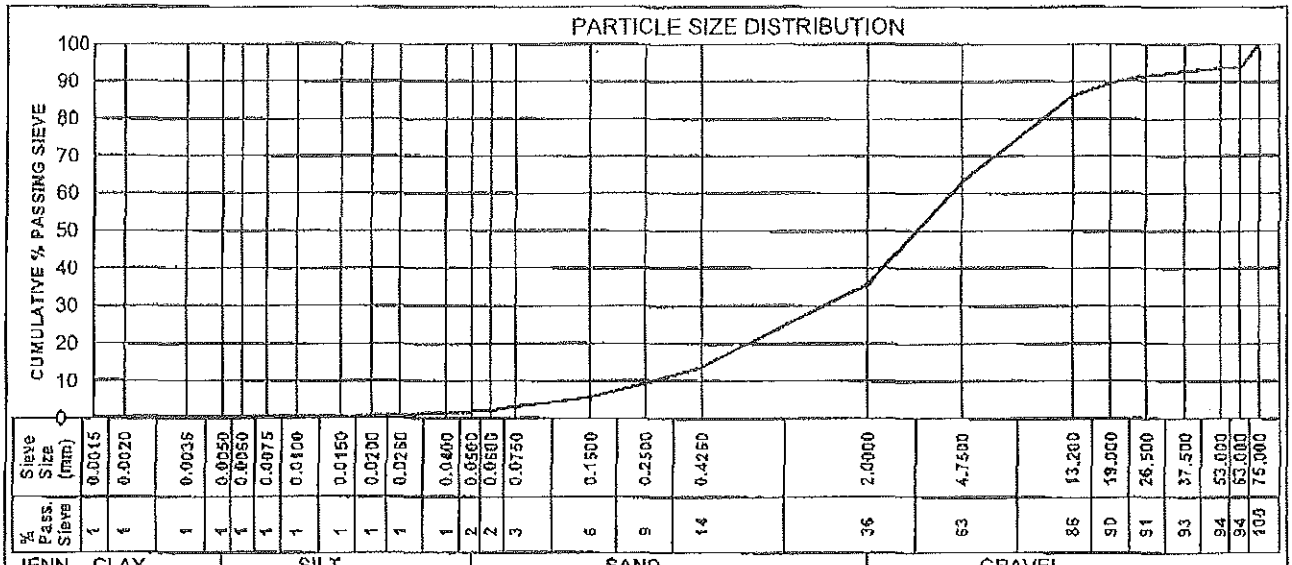
Sample No.	: K 0157
Hole No.	: C1
Depth	: -
Liquid Limit (%)	: -
Plasticity Index	: NP
Linear Shrinkage (%)	: 0.0
PI of Whole Sample	: 0
P.R.A. Classification	: A-1-a(0)
Unified Soil Classification	: SW
Activity	: 0.00
Heave Classification	: LOW
Grading Modulus	: 2.47
Percentage (<0.002)	: 1.0
Moisture Content (%)	: 0.3

Material Description : DARK OLIVE SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	0.6	1.2	33.9	64.4	SAND
Astm	0.6	2.6	60.1	36.7	SAND
British Standard	0.6	1.5	33.5	64.4	SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0250	0.0400	0.0560	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	1	1	1	1	1	1	1	1	1	1	1	2	2	3	6	9	14	36	63	86	90	91	93	94	94	100

JENN	CLAY	SILT	SAND	GRAVEL

ASTM	CLAY	SILT	FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL

BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks : SAMPLED AND DELIVERED BY CUSTOMER

FORM: A6 3.3R (06.10.2010)

Technical Signatory : Raymond van Niekerk

0219816724

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Reg.No.: 2000/030983/07 - VAT. Reg.No.: 4130197405
a SANAS Accredited Testing Laboratory, No. T0245
4 HARBOT CLOSE , BRACKENDUST , 7560
P.O BOX 1106 , BRACKENFELL
Tel. : 021 9815558
Fax : 021 9816724
Email : info@matrocast.co.za

TEST RESULTS

SKC ENGINEERS
P.O. BOX 229
PAARL
7620
Attention: MR M.LOUBSER

Project : SOLAR FARM , KENHARDT

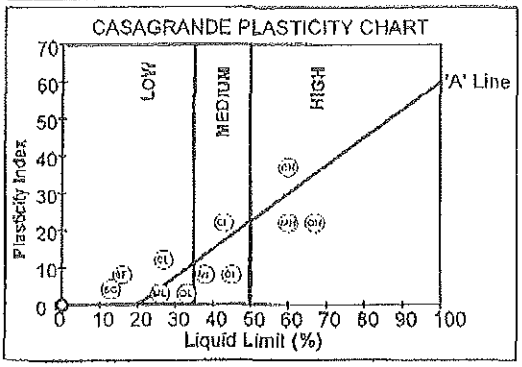
Your Ref :
Our Ref : 46168
Date Reported : 28.11.2012

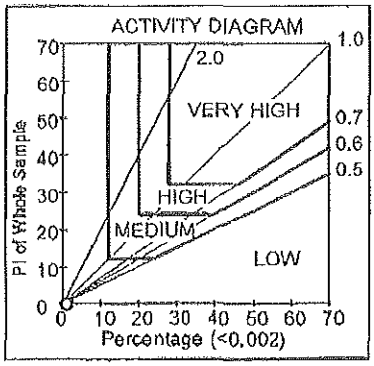
FOUNDATION INDICATOR (ASTM: D422)

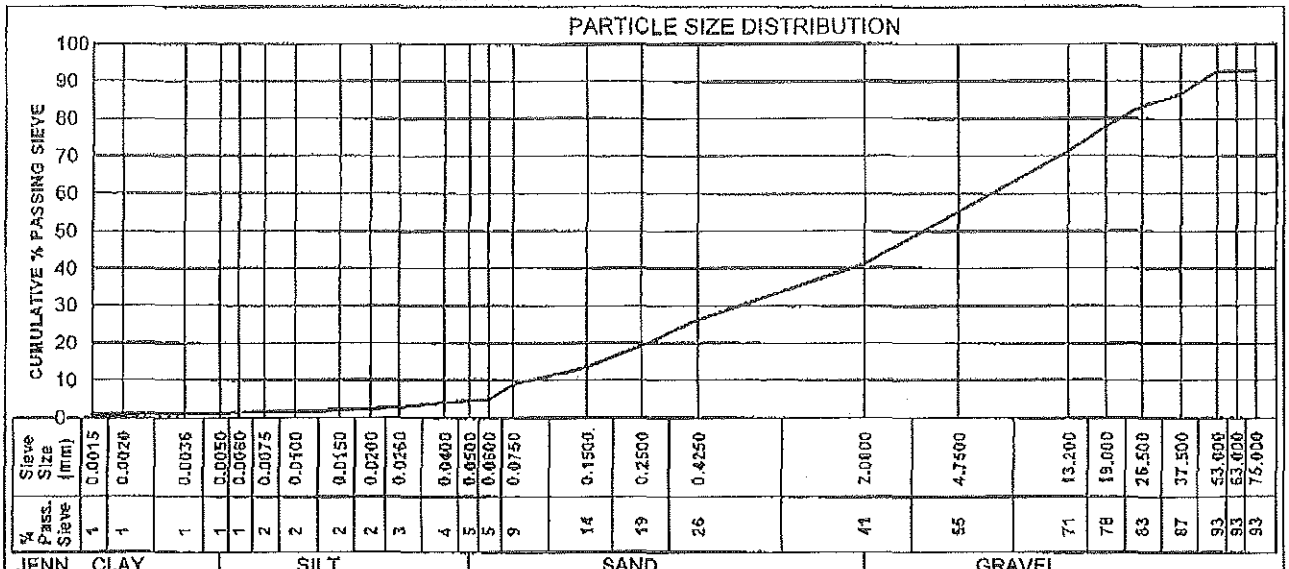
Sample No.	: K 0158
Hole No.	: D
Depth	: -
Liquid Limit (%)	: -
Plasticity Index	: NP
Linear Shrinkage (%)	: 0.0
PI of Whole Sample	: 0
P.R.A. Classification	: A-1-a(0)
Unified Soil Classification	: SW-SC
Activity	: 0.00
Heave Classification	: LOW
Grading Modulus	: 2.24
Percentage (<0.002)	: 1.0
Moisture Content (%)	: 2.3

Material Description : DARK BROWN SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	1.3	3.4	36.6	58.8	SAND
Astm	1.3	7.6	46.5	44.7	SAND
British Standard	1.0	4.0	36.2	58.8	SAND







Sieve Size (mm)	0.0015	0.0026	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0250	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0800	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	1	1	1	1	1	2	2	2	2	3	4	5	5	9	14	19	26	41	55	71	78	83	87	93	93	93

JENN CLAY	SILT	SAND	GRAVEL

ASTM CLAY	SILT	FINE SAND	MEDIUM SAND	COARSE SAND	GRAVEL

BS CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks : SAMPLED AND DELIVERED BY CUSTOMER

FORM: A6 3.3R (06.10.2010)

Technical Signatory : Raymond van Niekerk

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Tel. : 021 9815558
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Email : info@matrocast.co.za

TEST RESULTS

SKC ENGINEERS
P.O. BOX 229
PAARL
7620
Attention: MR M.LOUBSER

Project : SOLAR FARM , KENHARDT

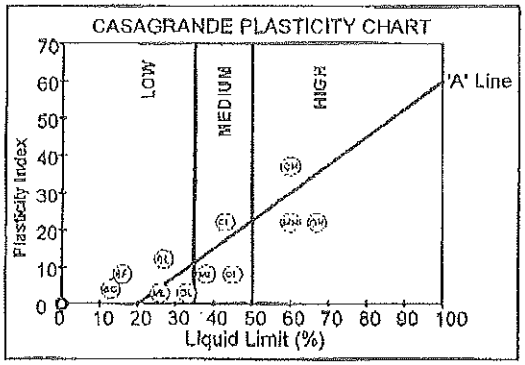
Your Ref :
Our Ref : 46168
Date Reported : 28.11.2012

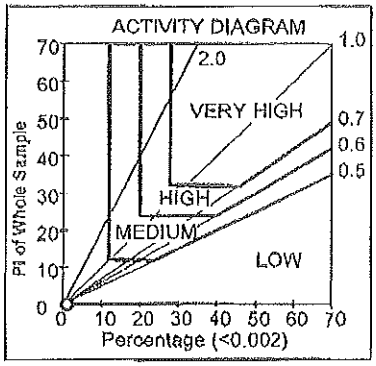
FOUNDATION INDICATOR (ASTM: D422)

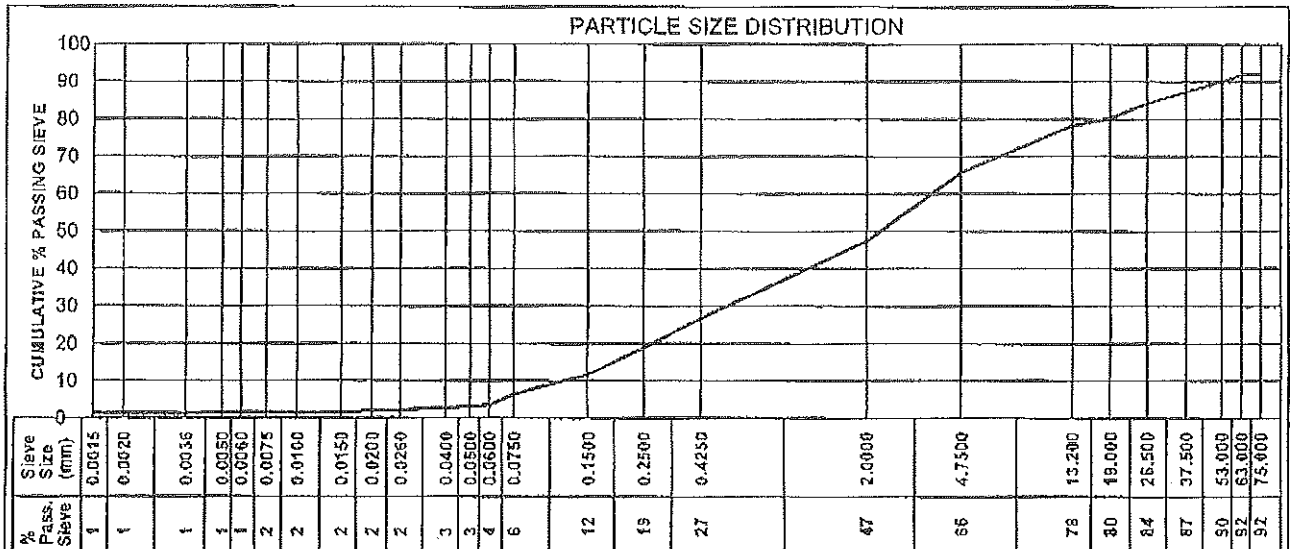
Sample No.	: K 0159
Hole No.	: G
Depth	: -
Liquid Limit (%)	: -
Plasticity Index	: NP
Linear Shrinkage (%)	: 0.0
PI of Whole Sample	: 0
P.R.A. Classification	: A-1-a(0)
Unified Soil Classification	: SW-SC
Activity	: 0.00
Heave Classification	: LOW
Grading Modulus	: 2.20
Percentage (<0.002)	: 1.0
Moisture Content (%)	: 2.3

Material Description : DARK OLIVE & BROWN SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	1.3	1.9	44.2	52.6	SAND
Astm	1.3	5.1	59.3	34.3	SAND
British Standard	1.1	2.5	43.8	52.6	SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0260	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	1	1	1	1	1	2	2	2	2	2	3	3	4	6	12	19	27	47	66	78	80	84	87	90	92	92

JENN CLAY	SILT	SAND	GRAVEL	
ASTM CLAY	SILT	FINE SAND / MEDIUM SAND	COARSE SAND	GRAVEL
BS CLAY / FINE SILT / MEDIUM SILT / COARSE SILT	FINE SAND / MEDIUM SAND / COARSE SAND	FINE GRAVEL / MEDIUM GRAVEL / COARSE GRAVEL		

Remarks : SAMPLED AND DELIVERED BY CUSTOMER

FORM: A6 3.3R (06.10.2010)

Technical Signatory : Raymond van Niekerk

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Tel. : 021 9815558
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Email : info@matrocast.co.za

TEST RESULTS

SKC ENGINEERS
P.O. BOX 229
PAARL
7620
Attention: MR M.LOUBSER

Project : SOLAR FARM , KENHARDT

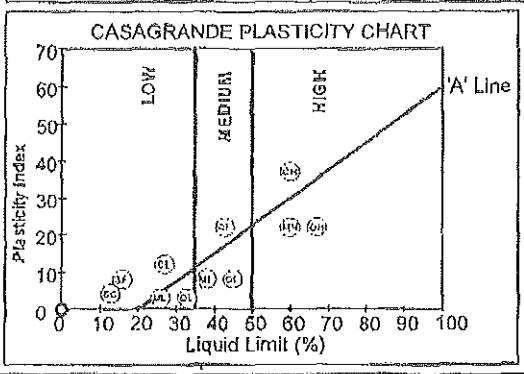
Your Ref :
Our Ref : 46168
Date Reported : 28.11.2012

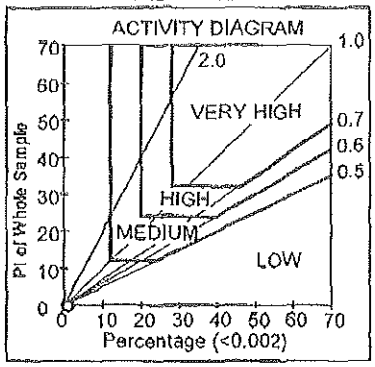
FOUNDATION INDICATOR (ASTM: D422)

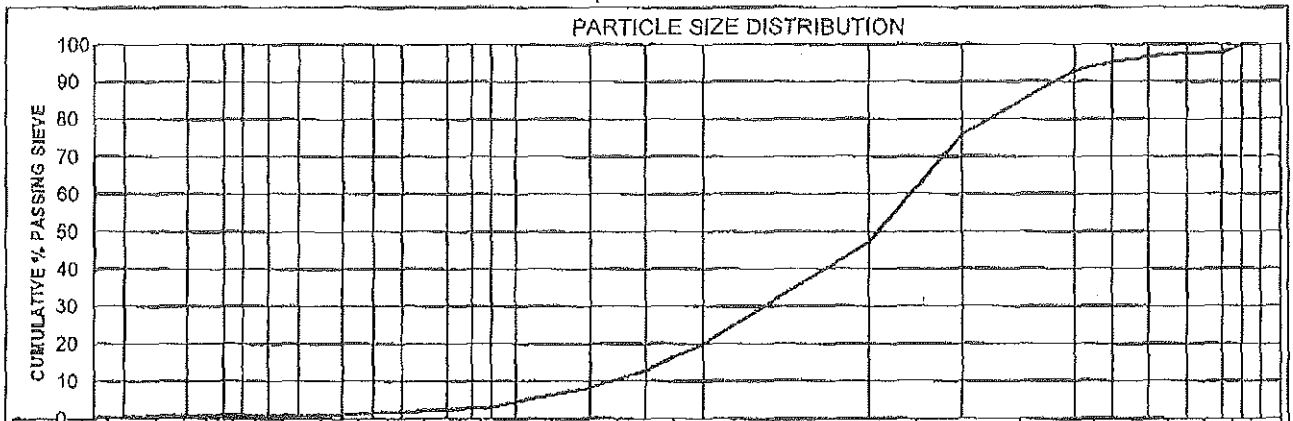
Sample No.	: K 0160
Hole No.	: H
Depth	: -
Liquid Limit (%)	: -
Plasticity Index	: NP
Linear Shrinkage (%)	: 0.0
PI of Whole Sample	: 0
P.R.A. Classification	: A-1-a(0)
Unified Soil Classification	: SW-SC
Activity	: 0.00
Heave Classification	: LOW
Grading Modulus	: 2.28
Percentage (<0.002)	: 1.0
Moisture Content (%)	: 1.0

Material Description : DARK OLIVE & BROWN SAND

	Clay (%)	Silt (%)	Sand (%)	Gravel (%)	Classification
Jennings	0.8	2.0	44.4	52.8	SAND
Astm	0.8	3.9	71.4	24.0	SAND
British Standard	0.6	2.5	44.1	52.8	SAND







Sieve Size (mm)	0.0015	0.0020	0.0036	0.0050	0.0060	0.0075	0.0100	0.0150	0.0200	0.0250	0.0400	0.0500	0.0600	0.0750	0.1500	0.2500	0.4250	2.0000	4.7500	13.200	19.000	26.500	37.500	53.000	63.000	75.000
% Pass. Sieve	0	1	1	1	1	1	1	1	1	2	2	3	3	5	8	13	20	47	76	93	95	97	98	98	100	100

JENN	CLAY		SILT		SAND			GRAVEL		
ASTM	CLAY		SILT		FINE SAND		MEDIUM SAND	COARSE SAND	GRAVEL	
BS	CLAY	FINE SILT	MEDIUM SILT	COARSE SILT	FINE SAND	MEDIUM SAND	COARSE SAND	FINE GRAVEL	MEDIUM GRAVEL	COARSE GRAVEL

Remarks : SAMPLED AND DELIVERED BY CUSTOMER

FORM: A6 3.3R (06.10.2010)

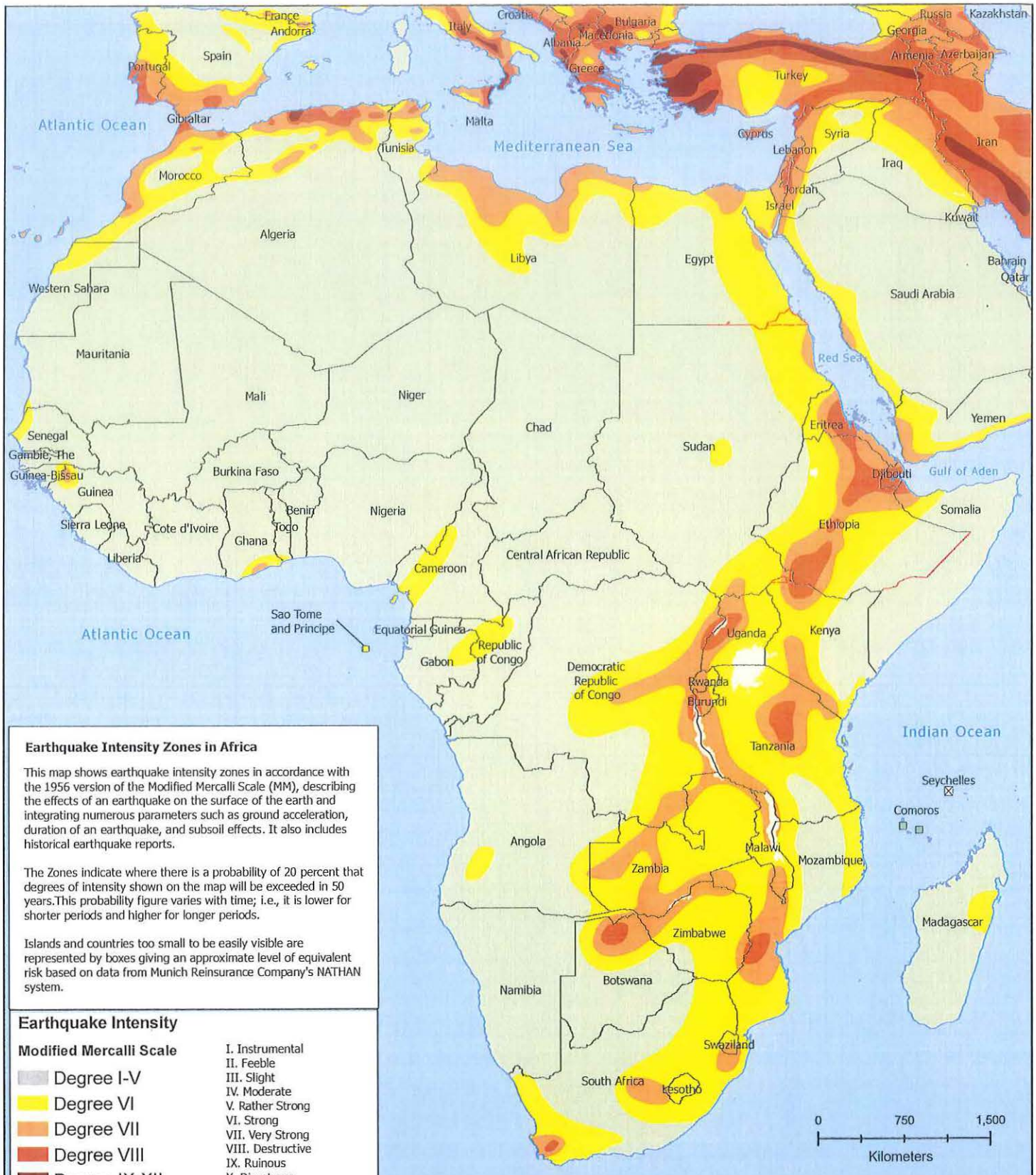
Technical Signatory : Raymond van Niekerk

Annexure C - Figures

OCHA Regional Office for Central and East Africa

Earthquake Risk in Africa: Modified Mercalli Scale

Issued: December 2007



Earthquake Intensity Zones in Africa

This map shows earthquake intensity zones in accordance with the 1956 version of the Modified Mercalli Scale (MM), describing the effects of an earthquake on the surface of the earth and integrating numerous parameters such as ground acceleration, duration of an earthquake, and subsoil effects. It also includes historical earthquake reports.

The Zones indicate where there is a probability of 20 percent that degrees of intensity shown on the map will be exceeded in 50 years.This probability figure varies with time; i.e., it is lower for shorter periods and higher for longer periods.

Islands and countries too small to be easily visible are represented by boxes giving an approximate level of equivalent risk based on data from Munich Reinsurance Company's NATHAN system.

Earthquake Intensity

Modified Mercalli Scale

Degree I-V	I. Instrumental II. Feeble III. Slight IV. Moderate V. Rather Strong
Degree VI	VI. Strong
Degree VII	VII. Very Strong
Degree VIII	VIII. Destructive
Degree IX-XII	IX. Ruinous X. Disastrous XI. Very Disastrous XII. Catastrophic
☒ Insufficient data	

Map data source: UNESCO (1987) through UNEP/GRID-Geneva, 1994, GAUL 2007, Hazard data from UNEP/GRID, the Pacific Disaster Center (PDC), and the Natural Hazard Assessment Network (NATHAN) by the Munich Reinsurance Co.

United Nations Office for the Coordination of Humanitarian affairs (OCHA)
Regional Office for Central and East Africa (ROCEA)
Email: roceainfo@un.org

DESCRIPTION: **PROPOSED NEW SOLAR POWER FACILITY - PORTION 7 ON OLYVEN KOLK 187, KENHARDT SOUTH AFRICA**

DATE	REFERENCE	BY
06/09/18	1 REPORT	M.dB

SKCMasakhizwe Engineers (Pty) Ltd
CONSULTING ENGINEERS TO BUILD THE NATION

13 PASTORIE AVENUE
PO BOX 229
PAARL
7620
TEL: (021) 871 1422/3
FAX: (021) 872 7740

9B CHURCH STREET
P.O.BOX 63
MALMESBURY
7300
TEL: (022) 487 3017
eMail: skcmsouth@skcm.co.za

TITLE: CONTOUR LAYOUT

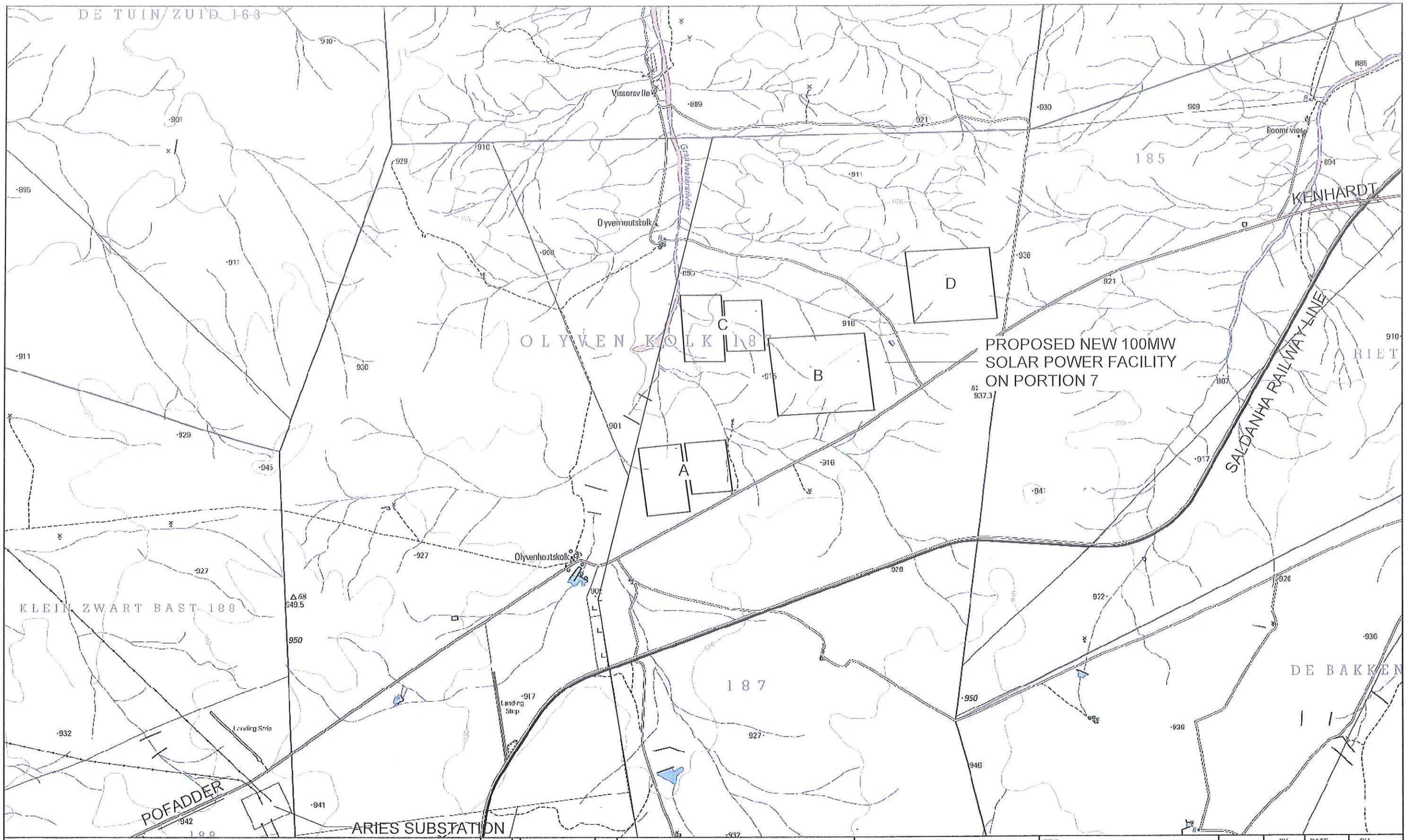
CLIENT: WINE ESTATE CAPITAL MANAGEMENT SOUTH AFRICA

	BY	DATE	CH
DESIGNED			
DRAWN	M.dB	2018/09/06	ML
TRACED			

SCALE: 1:1500

DRAWING NO.: FIGURE 1

REVISION: 1



DESCRIPTION: **PROPOSED NEW SOLAR POWER FACILITY - PORTION 7 ON OLYVEN KOLK 187, KENHARDT SOUTH AFRICA**

DATE		REFERENCE	BY
13/09/11	1	REPORT	M.dB

NOTE:

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9B CHURCH STREET, P.O.BOX 63, MALMESBURY, 7300, TEL: (022) 487 3017, eMail: skcmsouth@skcm.co.za

TITLE: SITE LOCATION

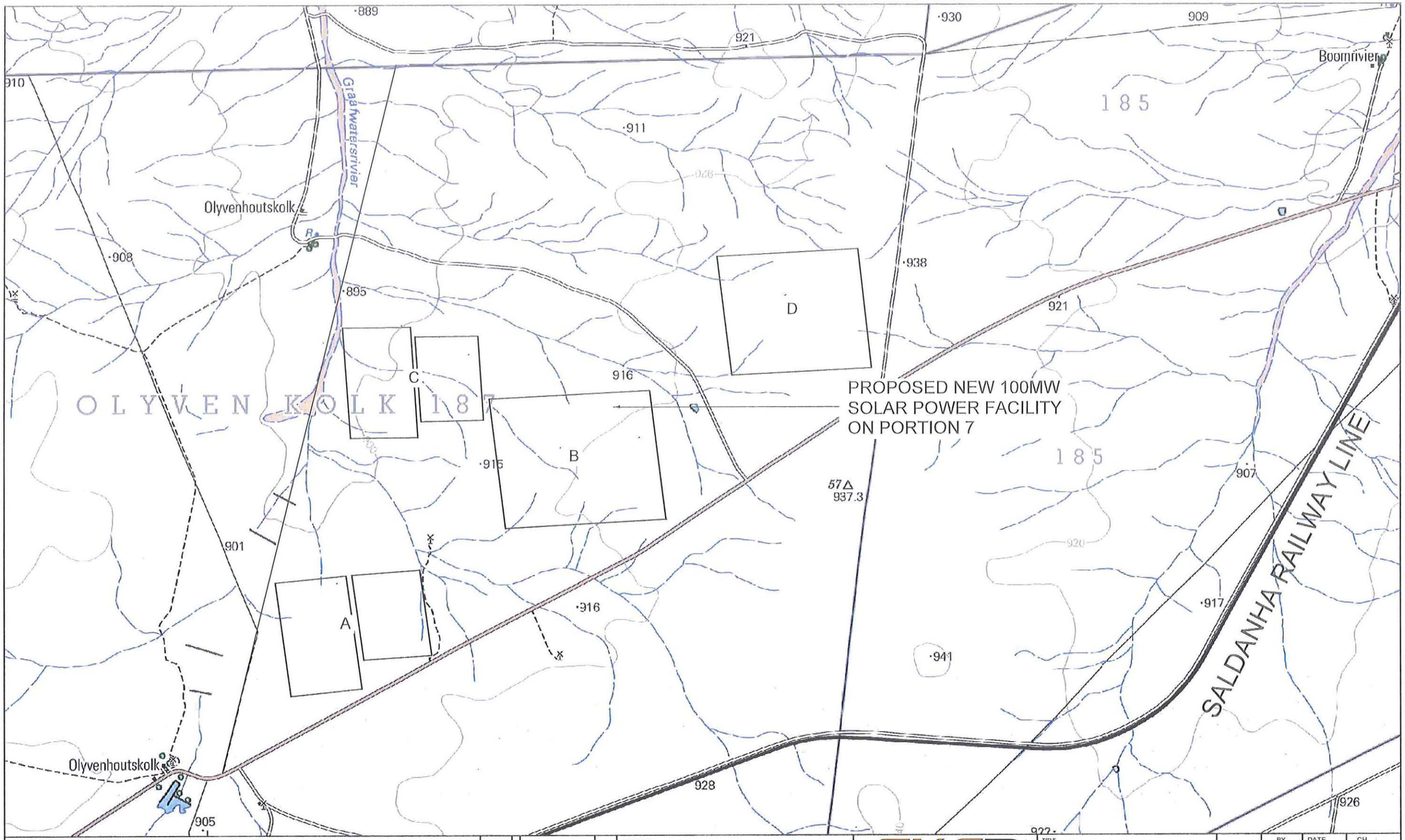
CLIENT: WINE ESTATE CAPITAL MANAGEMENT SOUTH AFRICA

	BY	DATE	CH
DESIGNED			
DRAWN	M.dB	2018/09/05	WV
TRACED			

SCALE : 1:50000

DRAWING NO.: FIGURE 2

REVISION: 1



DESCRIPTION:

PROPOSED NEW SOLAR POWER FACILITY - PORTION 7 ON OLYVEN KOLK 187, KENHARDT SOUTH AFRICA

DATE	REFERENCE	BY
21/11/12	1 REPORT	M.dB

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P.O.BOX 63
MALMESBURY
7300
TEL: (022) 487 3017
eMail: skcmsouth@skcm.co.za

TITLE: PROPOSED 100MW SOLAR POWER FACILITY SITE LAYOUT PORTION 7

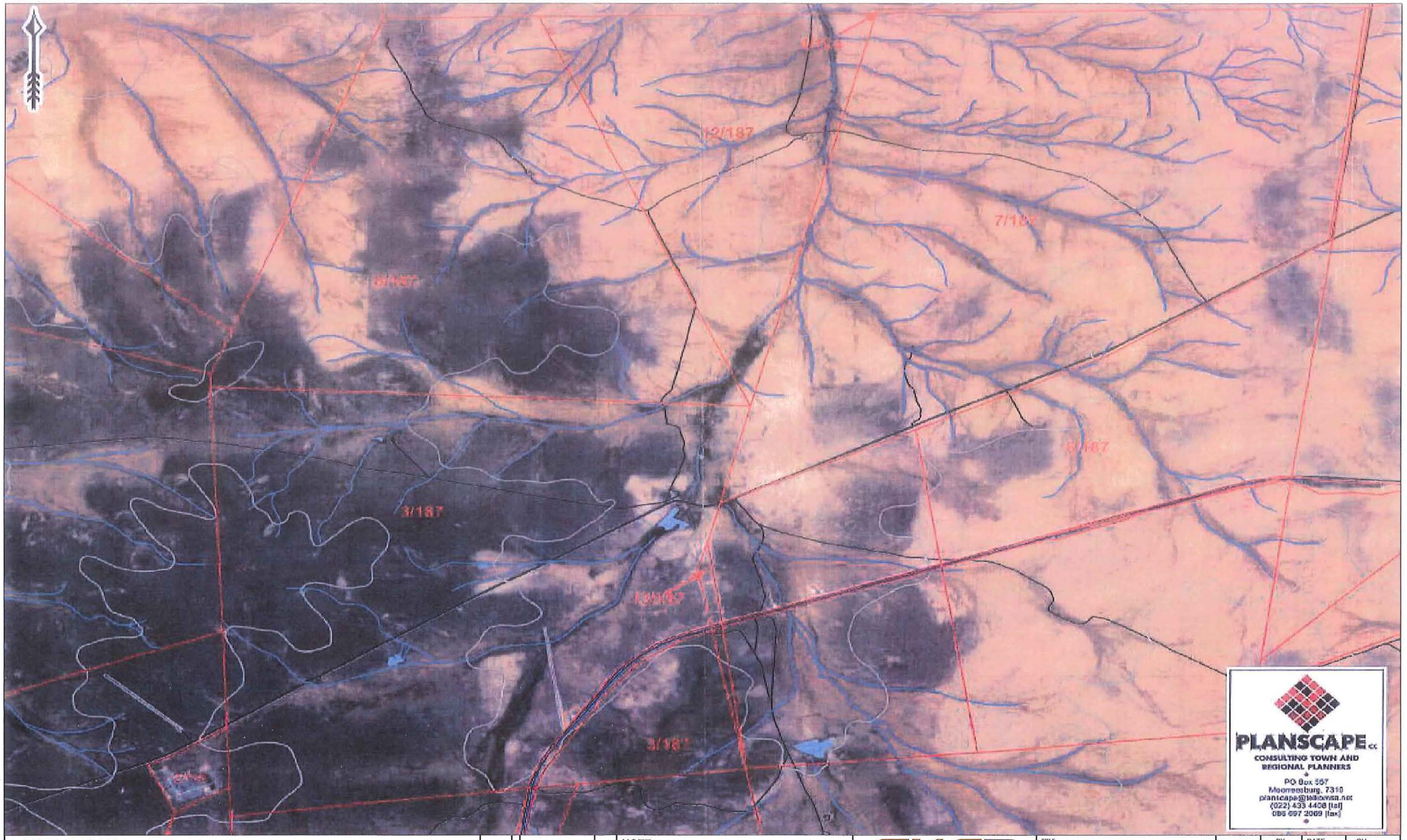
CLIENT:

	BY	DATE	CH
DESIGNED			
DRAWN	M.dB	2018/09/06	ML
TRACED			

SCALE : 1:30000

DRAWING NO.: FIGURE 3

REVISION: 1



DESCRIPTION: **PROPOSED NEW SOLAR POWER FACILITY - PORTION 7 ON OLYVEN KOLK 187, KENHARDT SOUTH AFRICA**

DATE	REFERENCE	BY
21/11/12	1 REPORT	M.dB

PLANSCAPE cc
CONSULTING TOWN AND REGIONAL PLANNERS
PO Box 567
Meerensburg, 7310
planscape@lantic.net
(022) 433 4408 (tel)
086 697 2069 (fax)

SKCM
SKCMasakhizwe Engineers (Pty) Ltd
CONSULTING ENGINEERS TO BUILD THE NATION
13 PASTORIE AVENUE, PO BOX 229, PAARL, 7620, TEL: (021) 871 1422/3, FAX: (021) 872 7740
9B CHURCH STREET, P.O.BOX 63, MALMESBURY, 7300, TEL: (022) 487 3017, eMail: skcmsouth@skcm.co.za

TITLE: CADASTRAL LAYOUT

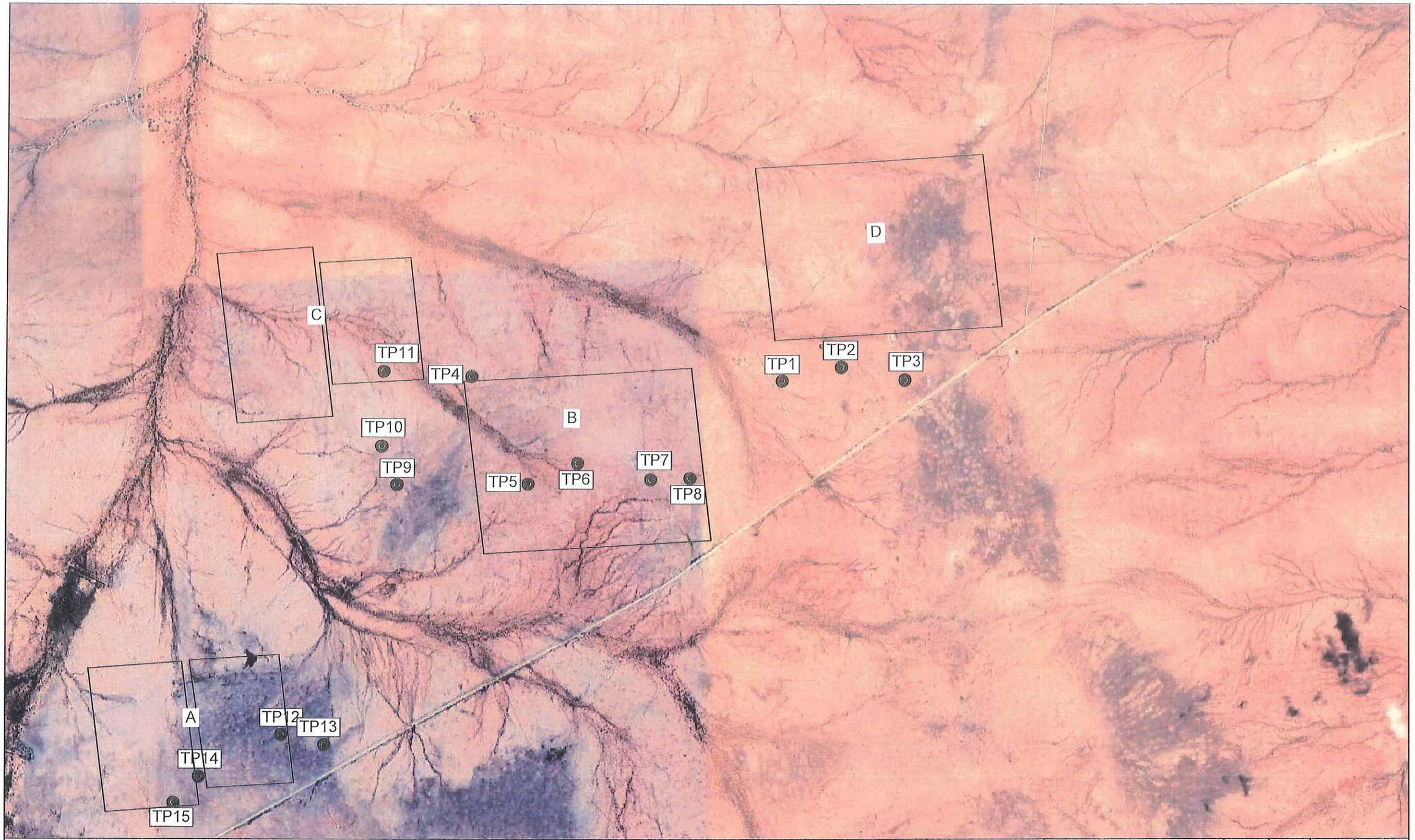
CLIENT: WINE ESTATE CAPITAL MANAGEMENT SOUTH AFRICA

	BY	DATE	CH
DESIGNED			
DRAWN	M.dB	2018/09/06	ML
TRACED			

SCALE : 1:30000

DRAWING NO.: FIGURE 4

REVISION: 1



DESCRIPTION:

PROPOSED NEW SOLAR POWER FACILITY - PORTION 7 ON OLYVEN KOLK 187, KENHARDT SOUTH AFRICA

DATE	REFERENCE	BY
21/11/12	1 REPORT	M.dB

NOTE:

SKCMasakhizwe Engineers (Pty) Ltd
CONSULTING ENGINEERS TO BUILD THE NATION

13 PASTORIE AVENUE
PO BOX 229
PAARL
7620
TEL: (021) 871 1422/3
FAX: (021) 872 7740

9B CHURCH STREET
P.O.BOX 63
MALMESBURY
7300
TEL: (022) 487 3017
eMail: skcmsouth@skcm.co.za

TITLE: TRIAL PIT POSITIONS

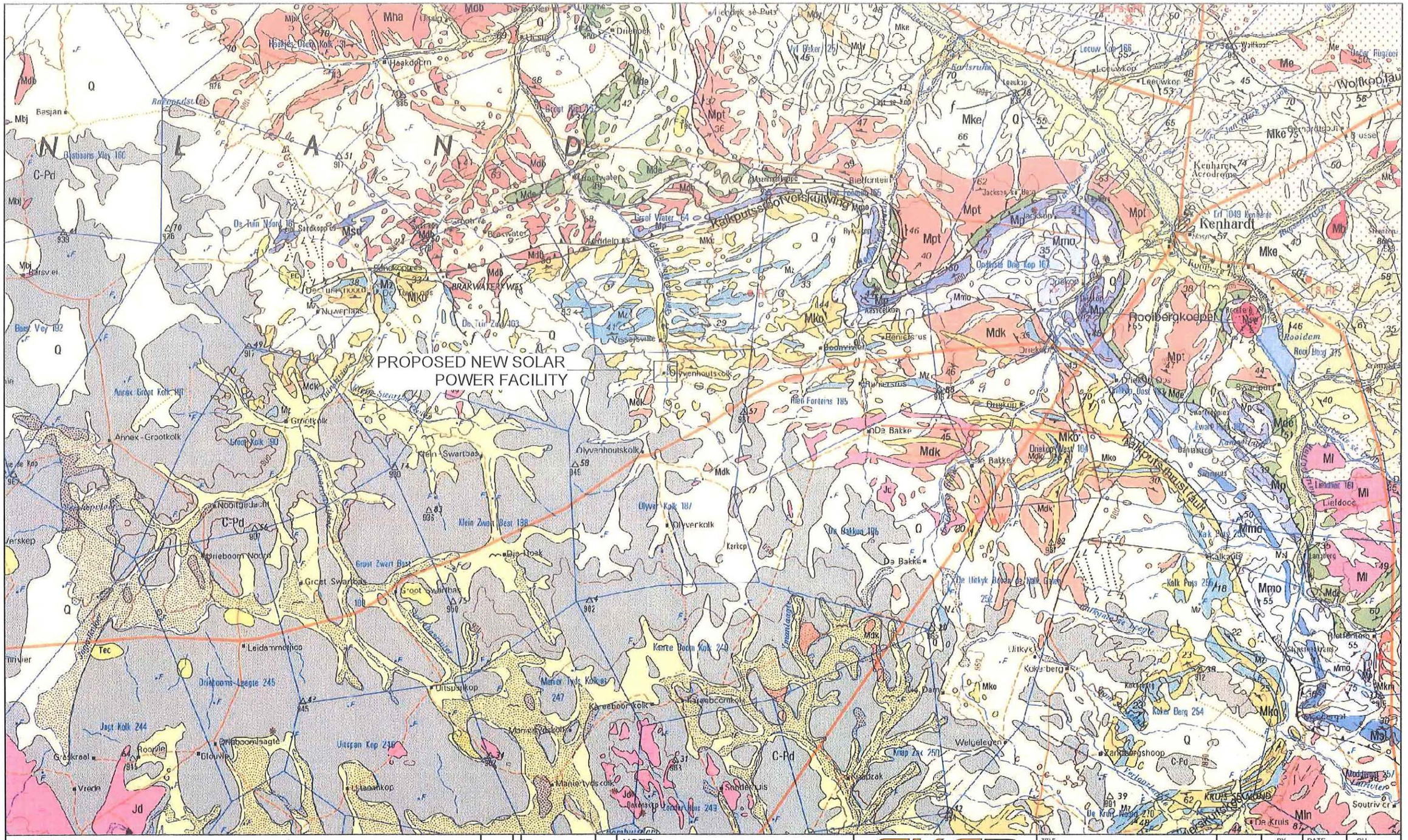
CLIENT: WINE ESTATE CAPITAL MANAGEMENT South Africa

	BY	DATE	CH
DESIGNED			
DRAWN	M.dB	2018/09/06	ML
TRACED			

SCALE : 1:30000

DRAWING NO.: FIGURE 5

REVISION: 1



DESCRIPTION:

PROPOSED NEW SOLAR POWER FACILITY - PORTION 7 ON OLYVEN KOLK 187, KENHARDT SOUTH AFRICA

05/09/18	1	REPORT	M.dB
DATE		REFERENCE	BY

SKCMasakhizwe Engineers (Pty) Ltd
CONSULTING ENGINEERS TO BUILD THE NATION

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PO BOX 229
PAARL
7620
TEL: (021) 871 1422/3
FAX: (021) 872 7740

9B CHURCH STREET
P.O.BOX 63
MALMESBURY
7300
TEL: (022) 487 3017
eMail: skcmsouth@skcm.co.za

TITLE: GENERAL GEOLOGY

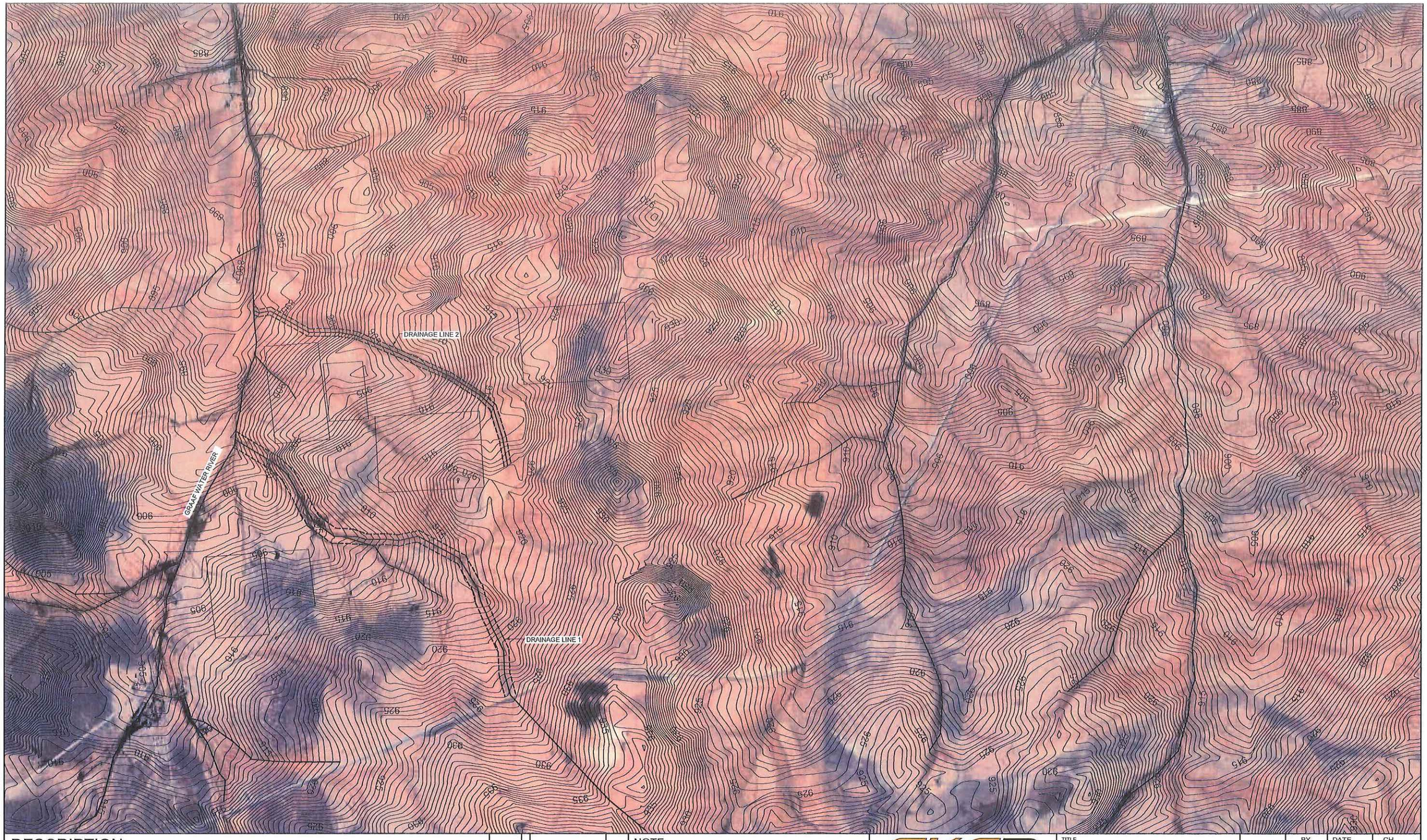
CLIENT: WINE ESTATE CAPITAL MANAGEMENT SOUTH AFRICA

	BY	DATE	CH
DESIGNED			
DRAWN	M.dB	05/09/2018	ML
TRACED			

SCALE: 1: 200000

DRAWING NO.: FIGURE 6

REVISION: 1



DESCRIPTION:

PROPOSED NEW SOLAR POWER FACILITY - PORTION 7 ON OLYVEN KOLK 187, KENHARDT SOUTH AFRICA

DATE	REFERENCE	BY
06/09/18	1 REPORT	M.dB

SKCMasakhizwe Engineers (Pty) Ltd
CONSULTING ENGINEERS TO BUILD THE NATION

13 PASTORIE AVENUE
PO BOX 229
PAARL
7620
TEL: (021) 871 1422/3
FAX: (021) 872 7740

9B CHURCH STREET
P.O.BOX 63
MALMESBURY
7300
TEL: (022) 487 3017
eMail: skcmsouth@skcm.co.za

TITLE: FLOOD LINES LAYOUT

CLIENT: WINE ESTATE CAPITAL MANAGEMENT South Africa

	BY	DATE	CH
DESIGNED			
DRAWN	M.dB	2018/09/06	ML
TRACED			

SCALE : 1:5000

DRAWING NO.: FIGURE 7

REVISION: 1