SCOPING REPORT

On contract research for

CCA Environmental

SOIL INFORMATION FOR PROPOSED DE AAR SOLAR ONE PHOTOVOLTAIC POWER PROJECT, NORTHERN CAPE

By

D.G. Paterson (Pr. Sci. Nat. 400463/04)

Report Number GW/A/2012/01

January 2012

ARC-Institute for Soil, Climate and Water,
Private Bag X79, Pretoria 0001, South Africa

Tel (012) 310 2500 Fax (012) 323 1157

DECLARATION

This report was prepared by me, DG Paterson of ARC-Institute for Soil Climate. I have an MSc degree in Soil Science from University of Pretoria and have considerable experience in soil studies and agricultural assessments since 1981. I have compiled more than 200 such surveys for a variety of purposes.

This specialist report was compiled on behalf of CCA Environmental (Pty) Ltd for their use in undertaking a Scoping and Environmental Impact Assessment process for the proposed De Aar Solar One Photovoltaic Power Project in the Northern Cape Province.

I hereby declare that I am qualified to compile this report as a registered Natural Scientist (Reg. No. 400463/04) and that I am independent of any of the parties involved and that I have compiled an impartial report, based solely on all the information available.

D G Paterson
January 2012

environmental affairs
Department:
Environmental Affairs
REPUBLIC OF SOUTH AFRICA

DETAILS OF SPECIALIST AND DECLARATION OF INTEREST

	(For official use only)
File Reference Number:	12/12/20/2313
NEAS Reference Number:	DEAT/EIA/0000362/2011
Date Received:	

Application for authorisation in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), as amended and the Environmental Impact Assessment Regulations, 2010

PROJECT TITLE

Proposed De Aar Photovoltaic Power Plant, Northern Cape

Specialist:	ARC-Institute for Soil, Climate and Water		
Contact person:	Garry Paterson		
Postal address:	Private Bag X79, Pretoria		
Postal code:	0001	Cell:	083 556 2458
Telephone:	012 310 2601	Fax:	012 323 1157
E-mail:	garry@arc.agric.za		
Professional affiliation(s) (if any)	Soil Science Society of SA; SA Soil Surveyors Organisation; International Erosion Control Association; Registered Soil Scientist (SACNASP)		

Project Consultant:	CCA Environmental (Pty) Ltd		
Contact person:	Jeremy Blood		
Postal address:	PO Box 10145, CALEDON SQUARE		
Postal code:	7905	Cell:	083 310 2037
Telephone:	(021) 461 1118	Fax:	(021) 461 1120
E-mail:	jeremy@ccaenvironmental.co.za		

The specialist appointed in terms of the Regulations_

I, D G PATERSON , declare that --

General declaration:

- I act as the independent specialist in this application
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing - any decision to be taken with respect to the application by the competent authority; and - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- all the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 71 and is punishable in terms of section 24F of the Act.

Signature of the specialist:

ARC-Institute for Soil, Climate and Water

Name of company (if applicable):

23rd May 2012

Date:

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1. INTRODUCTION AND TERMS OF REFERENCE

The ARC-Institute for Soil, Climate and Water (ARC-ISCW) was contracted by CCA Environmental (Pty) Ltd to undertake a soil investigation near De Aar, in the Northern Cape Province. The purpose of the investigation is to contribute to the scoping phase of the Environmental Impact assessment (EIA) process for the proposed *De Aar Solar One Photovoltaic Power Project* and associated power lines.

The study should:

- Describe the baseline conditions that exist on site and identify any sensitive areas that would need special consideration;
- Identify and assess potential impacts of the construction, operation and decommissioning phases, as well as the No-Go Alternative;
- Identify and list all legislation and permit requirements that are relevant to the development proposal;
- Identify areas where issues could combine or interact with issues likely to be covered by other specialists, resulting in aggravated or enhanced impacts;
- Indicate the reliability of information utilised in the assessment of impacts as well as any constraints to which the assessment is subject (e.g. any areas of insufficient information or uncertainty);
- Consider the precautionary principle in the assessment of all potential impacts;
- Identify feasible ways in which impacts could be mitigated and benefits enhanced giving an indication of the likely effectiveness of such mitigation and how these could be implemented in the construction and management of the proposed development;
- Comply with DEA guidelines as well as any other relevant guidelines on specialist study requirements for EIAs.

The objectives of the study are;

- Identify, map and describe the soils on site that could be affected by the proposed project based on available literature;
- Assess the broad agricultural potential of the site;
- Assess the significance of potential impacts of the proposed project on the soil and agricultural potential; and
- Identify practicable mitigation measures to reduce impacts and indicate how these could be implemented in the construction and management of the proposed project.

2. SITE CHARACTERISTICS

2.1 Location

An area was investigated lying approximately 10 km to the south-west of the town of De Aar. The area comprises Portion 3 of the farm Hartebeesplaats 135. The area lies between 30° 43' and 30° 44' S and between 24° 03' and 24° 04' E. The position of the site is shown on the map in Figure 1.

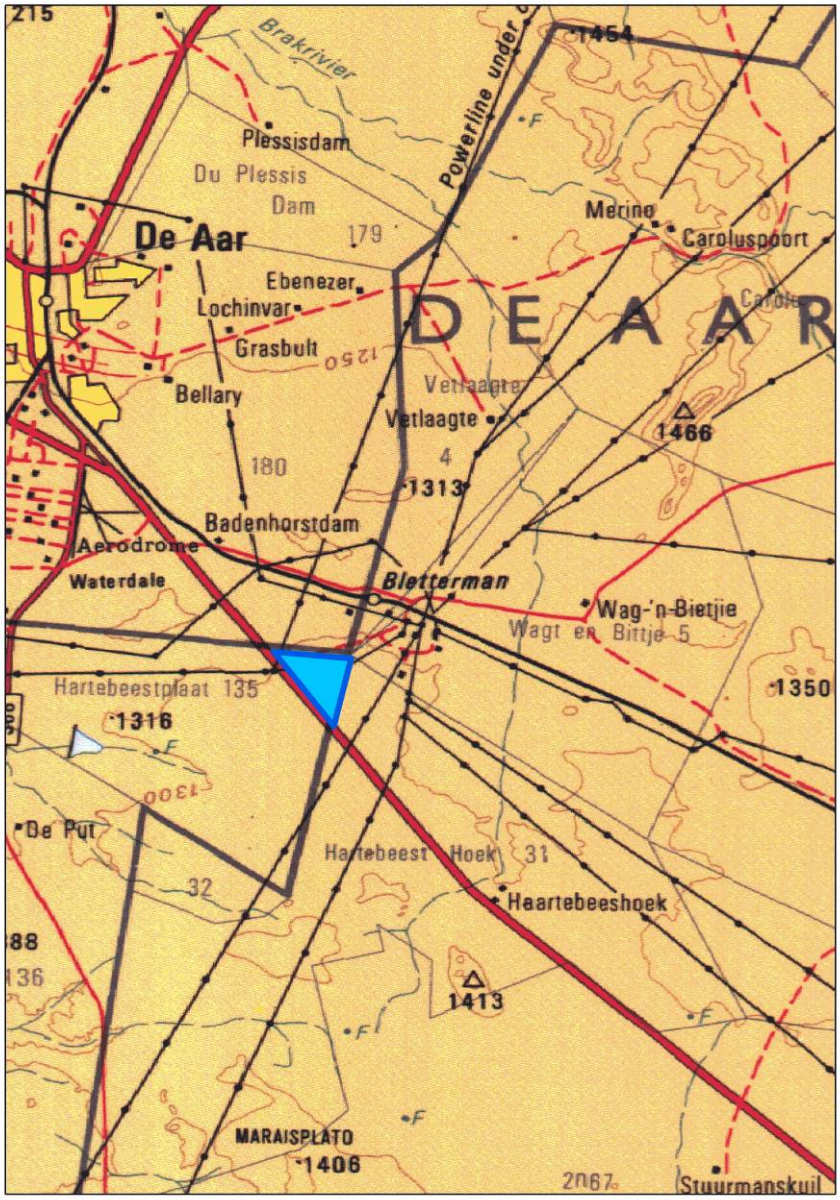

Figure 1 Locality map

2.2 Terrain

The site lies at a height of approximately 1 300 to 1 340 metres above sea level, and is gently undulating, although a steeper hill occurs in the north-eastern corner. No permanently wet drainageways are present in the area.

2.3 Climate

The climate of the study area (ARC-ISCW, unpublished) can be regarded as warm to hot with rain in summer and dry winters. The long-term average annual rainfall in this region of the Northern Cape is only 289 mm, of which 201 mm, or 70%, falls from November to April. Rainfall is erratic, both locally and seasonally and therefore cannot be relied on for agricultural practices. The average evaporation is over 2 000 mm per year, peaking at over 8.0 mm per day in December.

Temperatures vary from an average monthly maximum and minimum of 32.6ºC and 15.4ºC for January to 16.8ºC and 0.3ºC for July respectively. The extreme high temperature that has been recorded is 41.6ºC and the extreme low –11.1ºC. Frost occurs most years on around 30 days on average between late May and early September.

2.4 Parent Material

The geology of the area comprises mudstone and sandstone of the Adelaide Formation, Karoo Sequence, with dolerite intrusions, especially in the east (Geological Survey, 1997).

3. METHODOLOGY

Existing soil information was obtained from the map sheet 3024 Colesberg (Geers & Eloff, 1981) from the national Land Type Survey, published at 1:250 000 scale. A land type is defined as an area with a uniform terrain type, macroclimate and broad soil pattern. The soils are classified according to MacVicar *et al* (1977).

The area under investigation is covered by only one land type, as shown on the map in the Appendix, namely:

- **Ae137** (Deep, red, freely-drained soils, high base status)

It should be clearly noted that, since the information contained in the land type survey is of a reconnaissance nature, only the general dominance of the soils in the landscape can be given, and not the actual areas of occurrence within a specific land type. Also, other soils that were not identified due to the scale of the survey may also occur. **The site was not visited during the course of this study, and so the detailed composition of the specific land types has not been ground-truthed.**

4. SOILS

A summary of the dominant soil characteristics is given in **Table 1** below.

The distribution of soils with high, medium and low agricultural potential within the land type is also given, with the dominant class shown in **bold type**.

Table 1 Land type occurring (with soils in order of dominance)

Land Type	Dominant soils	Depth (mm)	Percent of land type	Characteristics	Agric. Potential (%)
Ae137	Hutton 33/36	200-400	69%	Red, sandy to sandy loam topsoils on hard rock	High:3.2
	Mispah 10/20	50-300	13%	Red-brown, occasionally calcareous topsoils on rock/calcrete	Mod: 0.0
	Swartland 20/21	100-200	10%	Red-brown, structured clay loam soils on weathering rock	**Low: 96.8**

5. AGRICULTURAL POTENTIAL

The area comprises shallow red and red-brown soils, mainly loamy and structureless, but more structured, clayey soils on the dolerite parent material in the east as can be seen from the information contained in Table 1. The very low rainfall in the area (Section 2.3) means that the only means of cultivation would be by irrigation and the Google Earth image of the area (Figure 2) shows absolutely no signs of any agricultural infrastructure and certainly none of irrigation.

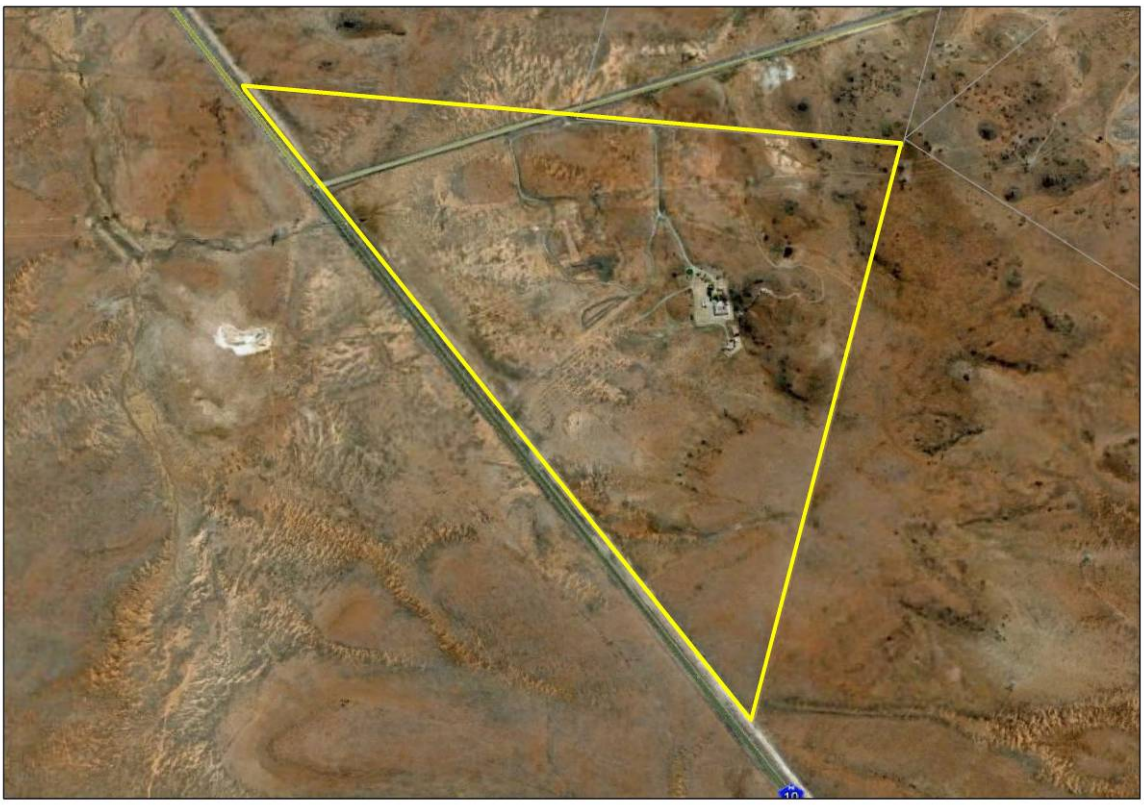

Figure 2 Google Earth image of study area

The climatic restrictions mean that this part of the Northern Cape is suited at best for grazing and here the grazing capacity is low, around 25-30 ha/large stock unit (ARC-ISCW, 2004).

6. IMPACTS

The major impact on the natural resources of the study area would be the loss of potentially arable land due to the construction of the various types of infrastructure. However, due to the dry and hot climate of the region (Section 2.3), this impact would in all probability be of limited significance and would be local in extent.

Regarding the erodibility of the soils in the area, the main potential effect in a dry region like the De Aar area is likely to be wind erosion. However, the soils in the study area are not considered to have a high erosion potential, as they have a light to medium texture, rather than being purely sand.

Despite this, almost any soil will erode to some degree if vegetation cover is removed, so care should be taken in the construction phase to minimize both the extent of excavations and time involved to the absolute minimum.

There are no “fatal flaw” or “no-go” aspects regarding the soils of the study area. The nature of the planned infrastructure would mean that grazing of livestock or game species between the solar panels should still be possible (if desired), so that the actual area lost to this form of agriculture would be small. At the end of the project life, it is anticipated that removal of the structures would enable the land to be returned to more or less a natural state following rehabilitation, with little impact, especially given the low prevailing agricultural potential.

The impact can be summarized as follows:

Table 3 Impact Assessment table

CRITERIA	WITHOUT MITIGATION	WITH MITIGATION
Extent	Local	Local
Duration	Long Term	Long Term
Intensity	Low	Low
Probability	Probable	Probable
Confidence	High	High
Significance	Low	Low
Cumulative impact	Low	Low
Nature of Cumulative impact	Loss of agriculturally productive soils and land that is no longer able to be utilized due to construction of infrastructure. This should also be assessed in terms of other solar energy projects in the vicinity, where larger combined areas will be affected.	
Degree to which impact can be reversed	Fully reversible. Removal of infrastructure at the end of the project should enable the site to be returned to close to its natural state.	
Degree to which impact may cause irreplaceable loss of resources	The low potential for arable agriculture, caused by a combination of shallow soils in many places and the hot, dry climate, means that the area has a low potential for cultivation and the resources are not irreplaceable.	
Degree to which impact can be mitigated	The main mitigation would be to ensure that as little pollution or other non-physical disturbance occurs. In addition, any potential erosion due to construction should be closely monitored, especially for removal by wind.	

Conclusion

Due mainly to the prevailing unfavourable climatic conditions for arable agriculture, as well as the prevalence of soils with limited depth, it is not envisaged that any more detailed soil investigation will be required.

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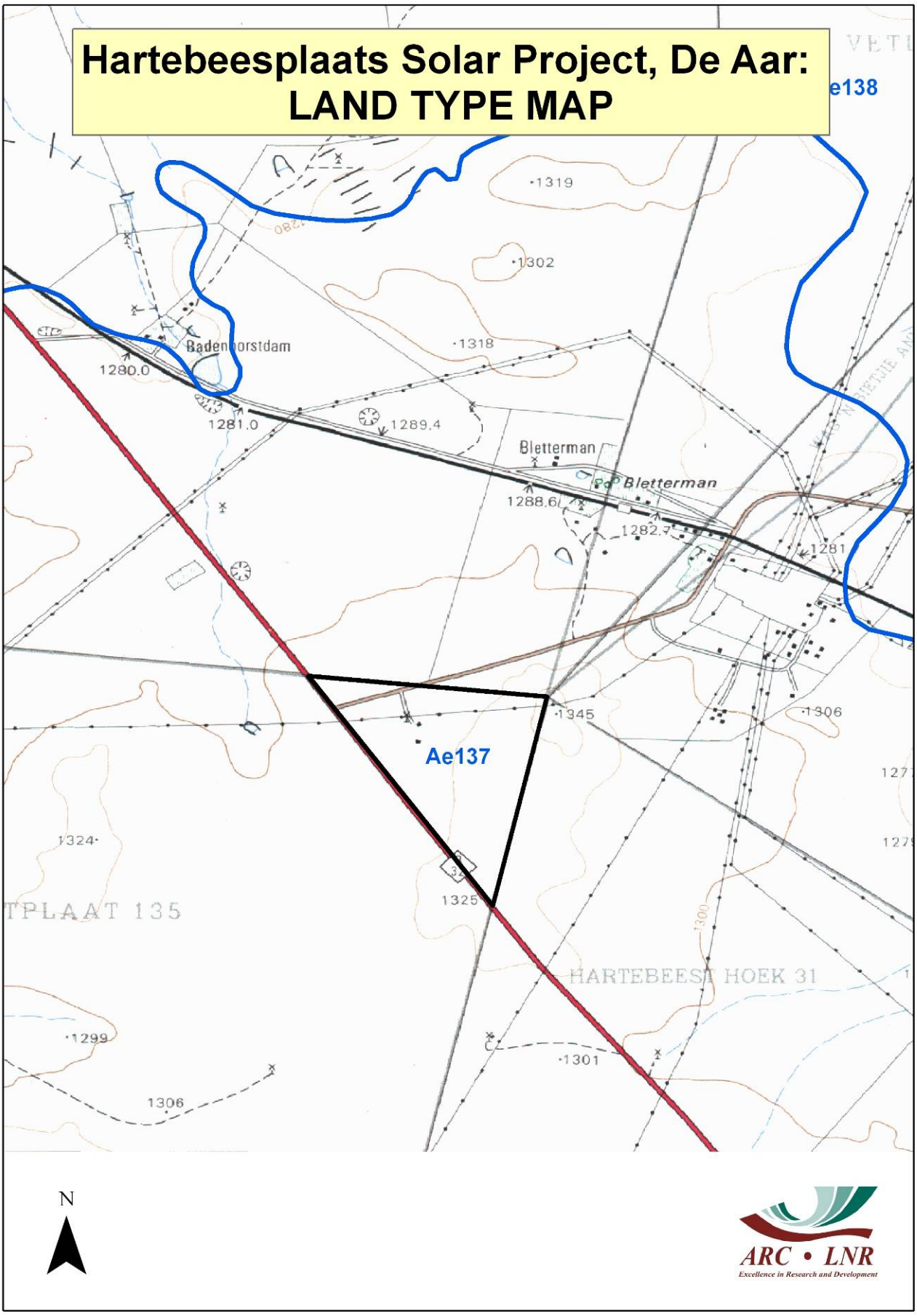
APPENDIX

MAP OF LAND TYPES


Hartebeesplaats Solar Project, De Aar:
LAND TYPE MAP
e138
1319
1302
1318
1280.0
1281.0
1289.4
Bletterman
Bletterman
1288.6
1282.7
1281
1345
1306
Ae137
1324
1325
TPLAAT 135
HARTEBEEST HOEK 31
1299
1301
1306
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