

**FINAL
INTEGRATED HERITAGE IMPACT ASSESSMENT COMPILED IN TERMS OF
SECTION 38(8) OF THE NATIONAL HERITAGE RESOURCES ACT, 1999
(ACT 25 OF 1999)**

**PROPOSED PHOTOVOLTAIC PARK: KUILSPOORT 161/9,
LEMOENFONTEIN SOUTH 162/REM & BULSKOP 163/1, DISTRICT
BEAUFORT WEST**



ON BEHALF OF: EAB Astrum Energy (Pty) Ltd

NOVEMBER 2011

STÉFAN DE KOCK
PERCEPTION Heritage Planning
PO Box 9995
GEORGE
6530
Tel: 082 568 4719
Fax: 086 510 8357
E-mail: perceptionenvplg@gmail.com

COPYRIGHT RESERVED



PERCEPTION

CONTENTS:

1. INTRODUCTION
2. INDEPENDENCE OF ASSESSOR
3. BACKGROUND
4. METHODOLOGY
5. DESCRIPTION OF STUDY AREA
6. DEVELOPMENT PROPOSAL AND ALTERNATIVES
 - 6.1 *30MW Concept One*
 - 6.2 *60MW Concept Two*
7. STATUTORY CONTEXT
 - 7.1 *Western Cape Provincial Spatial Development Framework (Nov 2005)*
 - 7.2 *Beaufort West Draft Spatial Development Framework (May 2007)*
 - 7.3 *Beaufort West Municipality Integrated Development Plan (2007/8)*
8. HISTORICAL BACKGROUND
 - 8.1 *Introduction*
 - 8.2 *Anglo Boer War*
 - 8.3 *Deed search*
9. HERITAGE RESOURCES & ISSUES
 - 9.1 *Built environment*
 - 9.2 *Landscape issues*
 - 9.2.1 *Regional and Natural landscape setting*
 - 9.2.2 *Cultural landscape context*
 - 9.2.3 *Urban context*
 - 9.3 *Visual – Spatial issues*
 - 9.3.1 *Recommendation and Conclusion*
 - 9.3.2 *Project description findings*
 - 9.3.3 *Planning key finding*
 - 9.3.4 *Regional landscape finding*
 - 9.3.5 *Site landscape findings*
 - 9.3.6 *Viewshed findings*
 - 9.3.7 *Exposure findings*
 - 9.3.8 *Receptor sensitivity findings*
 - 9.3.9 *Landscape sensitivity findings*
 - 9.3.10 *VRM Sensitivity Mapping Findings*
 - 9.4 *Archaeology*
 - 9.5 *Palaeontology*
 - 9.6 *Eco-tourism*
10. HERITAGE INFORMANTS AND INDICATORS
 - 10.1 *Built environment*
 - 10.2 *Landscape issues*
 - 10.3 *Visual-spatial issues*
 - 10.4 *Archaeology*
 - 10.5 *Palaeontology*
 - 10.6 *Eco-tourism*
11. PUBLIC PARTICIPATION
 - 11.1 *Environmental Scoping Phase*
 - 11.2 *Environmental Impact Assessment Phase*
12. ASSESSMENT OF IMPACTS
 - 12.1 *Indicators relating to Built environment issues*

- 12.2 Indicators relating to Landscape issues
- 12.3 Indicators relating to Visual-Spatial issues
- 12.4 Indicators relating to Archaeology
- 12.5 Indicators relating to Palaeontology
- 12.6 Indicators relating to Eco-tourism
- 12.7 Summary of recommended conditions of approval

13. ASSUMPTIONS AND LIMITATIONS

14. RECOMMENDATIONS

ANNEXURES:

1. Power of Attorney
2. HWC Records of Decision/ Comments
3. Photographs
4. Original farm boundaries
5. Constraints mapping
6. 60MW Concept Two
7. Surveyor General diagrams
8. Integrated Mapping summarising Visual issues and Design indicators
9. Visual Impact Assessment
10. Archaeological Impact Assessment
11. Palaeontological Impact Assessment
12. Perceived significance of impacts on heritage resources
13. Proof of public participation

LIST OF FIGURES:

1. Locality plan
2. Extract from 1880-1890 SG Maps
3. Recent aerial view: existing buildings
4. Major regional landscape, man-made features
5. Collage compiled from 1945 aerial photography

REFERENCES and ACKNOWLEDGEMENTS:

1. Cape Town Archives
2. VRM Africa (2011). *Draft Visual Assessment Report – Proposed Photovoltaic Solar Power Station Beaufort West*. Unpublished report, George
3. Chief Directorate: Surveys & Mapping
4. Deeds Office, Cape Town
5. Nilssen, P (2011). *Archaeological Impact Assessment – Proposed Beaufort West Photovoltaic (Solar) Park*. Unpublished report, Mossel Bay
6. Almond, J (2010). *Palaeontological Impact Assessment (Desktop study) – Proposed Photovoltaic Power station, Beaufort West Municipality, Western Cape*. Unpublished report, Cape Town
7. Schulz, K, (2010). *Historical background report –Beaufort West Photovoltaic Station*. Unpublished report, George
8. Surveyor General's Offices, Cape Town
9. Cape Environmental Assessment Practitioners (Pty) Ltd, (September 2011). *Final Scoping Report – Beaufort West – N1 Wind Farm*. Unpublished report, George

ABBREVIATIONS:

ACMP – Archaeological Conservation Management Plan
 CA – Cape Town Archives
 CDSM – Chief Directorate: Surveys & Mapping, Mowbray

CTDO – Cape Town Deed's Office
DEA – Department of Environmental Affairs (National)
ECO – Environmental Control Officer
NHRA – National Heritage Resources Act, 1999 (Act 25 of 1999)
NID – Notice of Intent to Develop
HIA – Heritage Impact Assessment
HWC – Heritage Western Cape
KOP – Key Observation Point
PPP – Public Participation Process
PAWC – Provincial Administration: Western Cape
RoD – Record of Decision
SAR – South African Railways
SDF – Spatial Development Framework
SGO – Surveyor General's Office

COVER PAGE: Google Earth image, 2010

1. INTRODUCTION

PERCEPTION was appointed during May 2011 by *EAB Astrum Energy (Pty) Ltd* for the provision of professional services relating to this proposal, as required in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act 25 of 1999) (NHRA). Sanction for compilation and submission of this application was provided by Florian Kroeber, (representative of the developer duly authorised), by way of a formal appointment (Power of Attorney) attached as Annexure 1.

This submission serves as a Heritage Impact Assessment (HIA) and includes inputs from the following specialist reports sanctioned as part of the HIA:

- Archaeological Impact Assessment (Pre-colonial, Historical) – CHARM (Dr. Peter Nilsson)
- Historical background report – Kathleen Schulz
- Desktop Palaeontological Impact Assessment – Natura Viva (Dr. John Almond)
- Visual Impact Assessment – VRM Africa (Stephen Stead)

2. INDEPENDENCE OF ASSESSOR

The Developer appointed *SE de Kock (PERCEPTION Heritage Planning)* as an independent professional heritage practitioner to facilitate the Heritage Impact Assessment (HIA) process running concurrently with the EIA process, the latter of which is facilitated by Cape Environmental Practitioners (Pty) Ltd (“CapeEAPrac”).

According to Regulation 18 of NEMA an EAP must be independent; amongst others have experience in conducting EIA’s (as well as specialist reports forming part of such EIA’s), perform the work relating to the application in an objective manner, comply with the Act, the environmental Regulations and all other applicable legislation, take into account, to the extent possible the matters relevant to the receiving environment, disclose all material information in the possession of the EAP that reasonably has or may have the potential of influencing a decision, or the objectivity of any submission to the competent authority, which with relation to the HIA refers to Heritage Western Cape.

With relation to the author’s appointment to compile and submit to Heritage Western Cape a Heritage Impact Assessment in terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act 25 of 1999), it is hereby declared that:

- This consultancy (including the author) is not a subsidiary, legally or financially, of the proponents;
- Remuneration for professional services by the proponent in relation to this proposal is not linked to approval by any decision-making authority responsible for permitting this proposal;
- Neither this consultancy, nor the author has any interests in secondary or downstream as a result of the authorisation of this project.

It is further hereby certified that the author has 14 years professional experience (3 years of which were abroad) as urban planner and 7 years professional experience as heritage practitioner (2 years of which were abroad). The author holds the following qualifications:

- Town and Regional Planning (B-Tech, CPUT, 1997)
- Environmental Impact Assessment Management – Heritage, Environmental (Dipl/ Masters, Dublin University, 2002)
- Architectural & Urban Conservation (GDP, UCT, 2007)
- Urban Design (CPD, UCT, 2009).

The author is professionally registered as follows:

- Town and Regional Planner – Irish Planning Institute (IRL)
- Accredited Heritage Practitioner – Association for Professional Heritage Practitioners
- Member – International Association of Impact Assessment (SA)

- Able to register as Town and Regional Planner with South African Council for Planners

3. BACKGROUND

The report follows submission of a NID and Heritage Statement to Heritage Western Cape (HWC) by *Perception Heritage* during June 2011 and its subsequent response dated 22nd June 2011 as summarised below (copy attached as part of Annexure 2):

- “*That a Heritage Impact Assessment is required consisting of*”/ *incorporating the following specialist studies and detailed site analysis with an integrated set of recommendations:*
 - Archaeological Impact Assessment;
 - Palaeontological Impact Assessment;
 - Visual Impact Assessment;
 - Analysis of Cultural Landscape Issues;
 - Analysis of Visual – Spatial Issues.

4. METHODOLOGY

As part of this HIA report the author has studied, visited, photographed and assessed the study area and its environs over a period of approximately nineteen months, which more specifically involved the following:

- Studying ownership history and social history pertaining to the site and its environs from relevant primary sources obtained in the Cape Town Archives and Deeds Office (independent research by historian Kathleen Schulz);
- Field work carried out on 19th June 2010 and 23rd June 2011;
- Negotiations, discussions with consultant team regarding nature and detailed design of proposed development;
- Focussed public participation process aimed at soliciting heritage-related comments from community members regarding proposed development and running concurrent with EIA Process;
- With relation to compilation of this HIA:
 - Research (site specific but also local context/ environs);
 - Identification of heritage-related issues and concerns;
 - Analysis of development site and its environs;
 - Identification of contextual spatial informants;
 - Transpose findings of Visual Impact Assessment, Archaeological Impact Assessment and Palaeontological Impact Assessment into this report;
 - Establishing cultural significance, based on criteria set out in NHRA;
 - Identification of heritage-related design informants based on the above;
 - Assess conformity of final proposed site layout to design informants identified.

5. DESCRIPTION OF STUDY AREA

The subject site (with combined area of ± 2,159ha) is comprised of portions of three individual cadastral land units listed below, all of which are registered to the Beaufort West Municipality (refer to Annexure 4 for diagram indicating historic property boundaries/ site boundary):

- Kuilspoort 161/9 – 845,8693 ha
- Lemoenfontein South 162/Rem – 531,9222 ha
- Bulskop 163/1 - 771,2722 ha

While outside the overall site boundary, note that electricity generated would be directed from the existing Noordeinde Substation (beside N1, directly-opposite the site) via existing overhead transmission lines to the Droërvier Substation – approximately 12.5km southwest of the site and directly beside the N12 road (see Figure 1 below).

The site is located c. 5km northeast of the Beaufort West urban area bound by the N1 National Road (southern site boundary) and the De Jagers Pass Road to the village of Loxton

(northern site boundary) as illustrated with the locality plan below. The site is east of the Karoo National Park and northwest of the Beaufort West “Karoo Gateway” Airfield. The historic Lemoenfontein guesthouse is located along the slopes of the Nuweveld Mountains, directly northwest of the site.

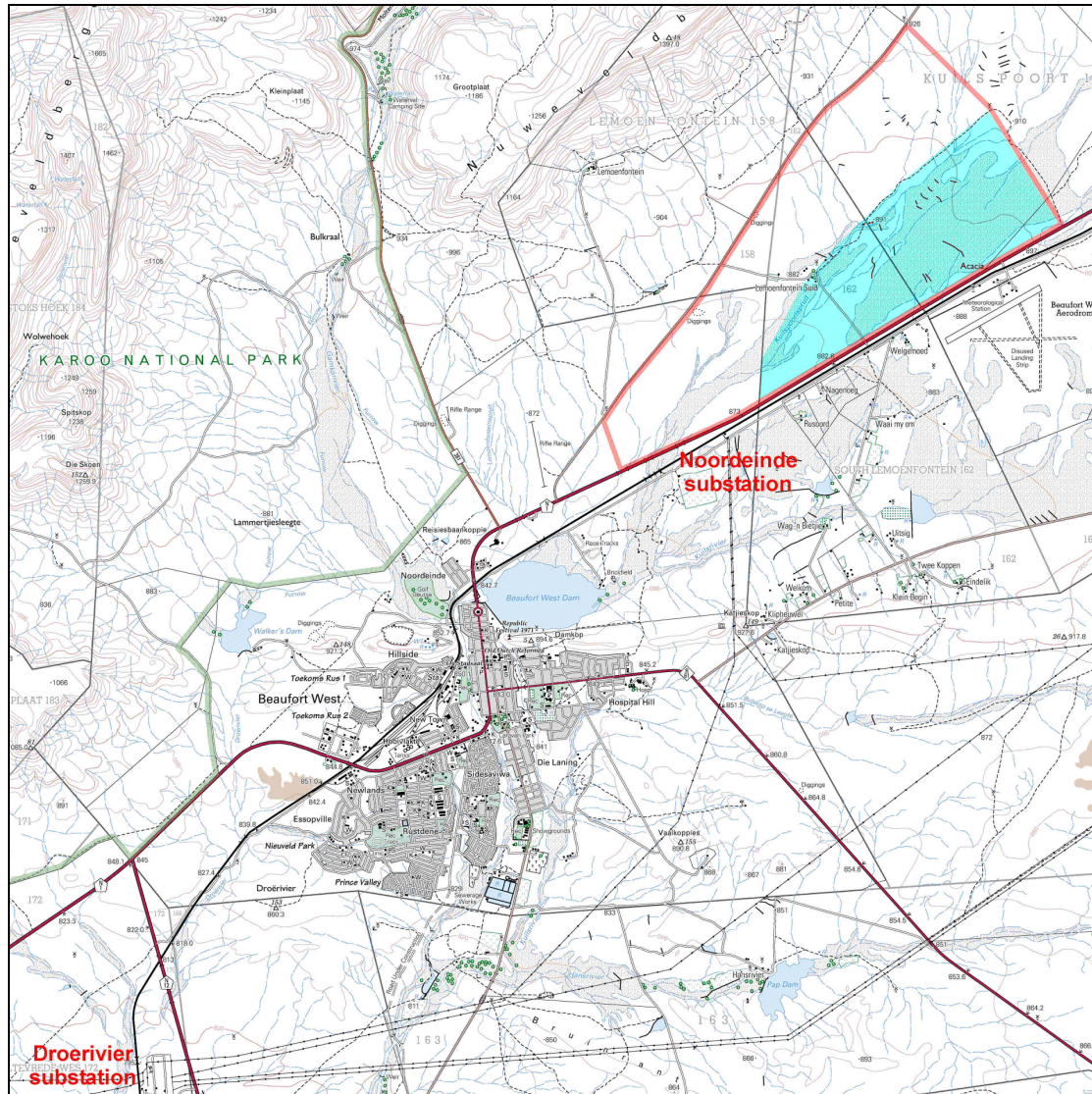


Figure 1: Locality of subject site (area highlighted blue) in relation to Beaufort West town, Karoo National Park and regional electricity grid (Source: 1:50,000 Topo-cadastral series, 3222BC, CDSM)

The site is located within a flat and arid landscape traversed by numerous natural drainage lines created over time by the non-perennial Kuilspoortspruit. Due to significant overgrazing, the entire site is sparsely vegetated and evidence of erosion was noted across the site, particularly along natural drainage lines. No structures or ruins older than 60 years and/or gravesites could be located on the site. A former residence and associated outbuildings (used by SAPD as the headquarters for the local livestock theft prevention unit between February 1995 and January 2001), appear to have fallen in complete disuse. Further photographs of the site as well as detailed description of the site and its environs are contained in Annexure 3 and Section 9.2 of this report, respectively.

Figure 1 highlights the overall development site (red outline), which includes two separate renewable energy development applications by the same developer, including a Photovoltaic Park (area highlighted in blue) and Wind Farm (area inside overall site boundary but not highlighted). HWC's recent decision dated 9th November 2011 pertaining to said Wind Farm application is attached as part of Annexure 2 to this report.

6. DEVELOPMENT PROPOSAL AND ALTERNATIVES¹

The applicant partners signed a lease agreement with the Beaufort West Municipality for the development of a Renewable Energy Facility on four municipal properties east of Beaufort West. The northern section of the target properties is subject to an on-going environmental process for the proposed Beaufort West-N1 Wind Farm. As part of this process a setback/ buffer area of 2.5km was instituted from the Karoo Gateway Airstrip. This action effectively sterilized the southern section of the target properties for wind-energy generation, but not for *other* renewable energy options. The proposed siting of this Photovoltaic/ solar-energy facility has thus been informed by the above, and is proposed within this 2.5km buffer area, in the southern section of the combine renewable energy property.

This solar-energy proposal thus optimises the renewable energy generation potential of the municipal properties designated for this purpose while accommodating constraints identified by stakeholders and the project team through the EIA and HIA processes followed thus far.

6.1 30MW Concept One

This initial alternative proposed that the solar energy generation facility would have a **maximum capacity of 30MW** (megawatts), amounting to approximately **132 000 panels** arranged in rows within 12 array racks on the RE/162 property. This capacity has been adjusted to a 60MW proposal due to the following reasons:

- Good solar radiation levels in the Beaufort West area, considered to be a favourable resource, making the site ideal for the production of solar energy using photovoltaic panels;
- Flat topography at the site and its the availability for use for an alternative energy generation facility;
- Grid connection potential based in proximity to existing transmission and substation infrastructure; and
- Fact that Photovoltaic electricity generation has the potential to achieve a higher allocation in the future energy mix.

Based on the above, the 30MW alternative was considered to be **limited**, has thus been **excluded** from the project proposal and has not been assessed as part of the Environmental Impact Assessment.

6.2 60MW Concept Two

This involves a solar energy generation facility of with a total **generation capacity of 60MW** (megawatts) amounting to approximately **264 000 photovoltaic panels** arranged in two array groupings of 30MW each. Each array grouping will consist of approximately 11 array racks and cover a footprint of approximately 75 ha (hectares). The Photovoltaic Park solar array will thus cover an area of 150ha in total (two array groupings of 30MW each, as well as associated infrastructure). The electricity to be generated will be fed into the national Distribution System.

Based on the constraints identified in the scoping specialist studies and comments received from stakeholders on the Scoping Report, the initial 60MW layout has been revised to present this mitigated layout option as considered during the Environmental Impact Reporting (EIR) phase. This layout option was developed to avoid the following areas of sensitivity and setback lines / buffers (see environmental constraint maps attached as part of Annexure 5):

- Areas of high geological sensitivity;
- 1:100 year floodline associated with the Kuilspoortspruit drainage line and tributaries;
- Sensitive Archaeological occurrences;
- Sensitive Palaeontological occurrences;
- Sensitive Biophysical occurrences;

¹ Information transposed from Final Scoping Report – Beaufort West Photovoltaic Park, Cape Environmental Assessment Practitioners (Pty) Ltd, September 2011 and subsequent correspondence.

- 400m setback departure from SANRAL that has been granted/confirmed.

Three technological alternatives are being considered for the design of the 60MW Photovoltaic Park as part of the 60MW Concept Two. Although each technological alternative differs in terms of panel arrangement and facility design, the total footprint of the PV Park facility will remain 150ha. These technological alternatives are as follows:

- **Alternative 1** – 4 rows, 4.367m high, spaced approx. 11.94m apart over 150ha (layers of p-type and n-type silicon semi-conductors);
- **Alternative 2** – 2 rows, 2.583m high, spaced approx. 5.9m apart over 150ha (layers of p-type and n-type silicon semi-conductors);
- **Alternative 3** (preferred alternative) – “CIS thin-film panels”, 2.89m high, spaced approx. 6m apart over approx.125ha (thin film semi-conductor, elements of copper, indium & selenium). Technology employed with this Alternative is the most advanced of the three.

Infrastructure required for the facility will include:

- An array of PV panels;
- Support structures of PV panels;
- DC to AC Inverters;
- Transformer;
- Overhead power line (132kV) of approx. 6km feeding into Beaufort West Substation;
- Underground cabling between PV panels;
- Internal access roads;
- Workshop area for maintenance and storage.

The PV array forms an array of interconnected PV cells. Each PV cell consists of a thin film semiconductor layer composed of the elements copper, indium and selenium. This PV technology is referred to as CIS thin film. When photons with sufficient energy strike electrons in the valence band of the semiconductor, they are excited into the conduction band and pulled through an externally connected circuit by the electric field caused by the semiconductor. The stream of electrons released by irradiation from the sun creates a DC current. Cells are connected and encapsulated behind glass to protect them from the environment forming a PV panel.

7. STATUTORY CONTEXT

7.1 *Western Cape Provincial Spatial Development Framework (Nov 2005)*

This document identifies the importance of renewable/ alternative energy.

The WC PSDF also makes reference to transmission lines, specifying that they should be aligned along existing and proposed road and/or rail linkages corridors rather than along point to point cross-country routes, as these raise issues of visual blight, unviably shaped land parcels, need for access roads and destruction of cultural landscapes. It also mentions that care should also be taken to avoid bird migration routes.

The proposed overhead transmission line associated with the Beaufort West Photovoltaic Park will be aligned within an existing servitude, beside an existing transmission line. The impacts of the transmission line will be assessed along with those of the farm itself.

7.2 *Beaufort West Draft Spatial Development Framework, May 2007*

This policy guideline document does not make any spatial/ land use proposals for the subject site and as such, an extract from said plan has not been inserted here. According to the SDF, the municipality completed a feasibility study and EIA during November 2003 for the construction of a wind farm, “at the old Airport Site” (Section 8.1.3, Volume 1). While this project has not been implemented, it is clear that this renewable energy generation proposal is in line with the intentions of the Municipality. It further states that renewable/ alternative energy generation is, “seen as one of the IDP strategies with a high community benefit as it

will aim to avoid power cuts and also provide the opportunity to use energy in developing SMME.

Given the above statements and taken in conjunction with the municipal IDP (Section 7.3 below), we do not consider that the proposal would be inconsistent with the overall aims of the Draft SDF.

7.3 Beaufort West Municipality Integrated Development Plan (2007/8)

This document identified the development of a renewable/ alternative energy facility as one of their key performance areas / proposed interventions. Considering the proximity of the proposed Beaufort West Photovoltaic Park to the Karoo Gateway Airstrip, the Beaufort West SDF and IDP were reviewed. Although the SDF makes no reference to the further development of the aerodrome, the IDP discusses the need to “revitalize” the airport. We are aware that proposals are currently underway to extend existing facilities. The reasoning behind this need includes: foreseen increases in visitors and business people to Beaufort West, the need for increased investment in human and infrastructure, the limitations of overland transport (far from harbours), the poor flight climatic conditions in George and prospects of uranium mining initiative near Beaufort West. The proposed Beaufort West Photovoltaic Park has been assessed in terms of its potential impact on the Karoo Gateway Airstrip in its current form, however mindful of its potential redevelopment.

In addition to a project of this nature being supported through local policy and planning, the proposed Beaufort West – N1 Photovoltaic Park would contribute towards both National and Provincial targets for renewable energy and Eskom’s target for IPP’s, as well as assist in meeting the increasing electricity demands in South Africa and specifically in the Western Cape.

8. HISTORICAL BACKGROUND

Historical background research (Kathleen Schulz) was commissioned as a specialist input into this Heritage Impact Assessment report and focussed primarily on ownership and social history but included inputs from other relevant primary sources obtained in the Cape Town Archives, Deeds Office and Surveyor General’s Office.

8.1 Introduction

Beaufort West was established on a farm named Hooyvlakte in 1818 near the foothills of the Nuweveld Mountain range. The Gamka River ran through the farm. The town was awarded municipal status in February 1837². The Koup³ and Nieweveld were regional names given to the Karoo interior prior to the establishment of towns Graaff Reinet⁴ and Beaufort West. Land surrounding the now Beaufort West region was more frequently referred to as the Nieweveld region. By the year 1800 colonial stock farmers were well established in the Koup and Nieweveld areas as attested by deceased residents’ estate papers lodged with the Dutch East India Orphan Chamber during the eighteenth and nineteenth centuries. During the latter part of the 18th century land ownership of the Koup and Nieweveld was bitterly contested between indigenous groups and colonial settlers and these border conflicts are historically significant. There is a possibility that material evidence may be still be found on or in the ground relating to this period.

Formal recorded commando attacks on nomadic tribes living in the Roggeveld and Coup began in 1770 and continued until 1799. Thereafter factional conflicts between indigenous people and colonial settlers continued to move towards the borders of the Eastern Cape.

² A Dictionary of South African Place Names ; P E Raper Pub. J Ball Johannesburg. 1989.

³ Also spelt ‘Coup’, ‘Ghaup’, ‘Gouph’ in early written records.

⁴ Formally established in 1786.

Conflict zones appear to have been on farms, areas near to the higher mountain ranges and along the wagon routes⁵.

Estate papers were found from archival sources referring to occupation of the Nieuweveld region from as early as 1760⁶. Documents included inventories of goods owned by the deceased at the time of death and usually included the name of the farm or farms owned. No inventories were found for the farms under investigation. The absence of documentation from this source does not eliminate the possibility of informal colonial or indigenous occupation on the farms during the eighteenth century, or before this time.

No Dutch East India loan farm agreements were found to be registered against any of the four farms in the Cape Town archive repository⁷. Loan farm agreements ceased to exist between farmers and Government in 1813 when South African British government replaced loan farm agreements with the quitrent system. The quitrent system allowed tenants to own state land after paying an annual rental for a period of twenty years.

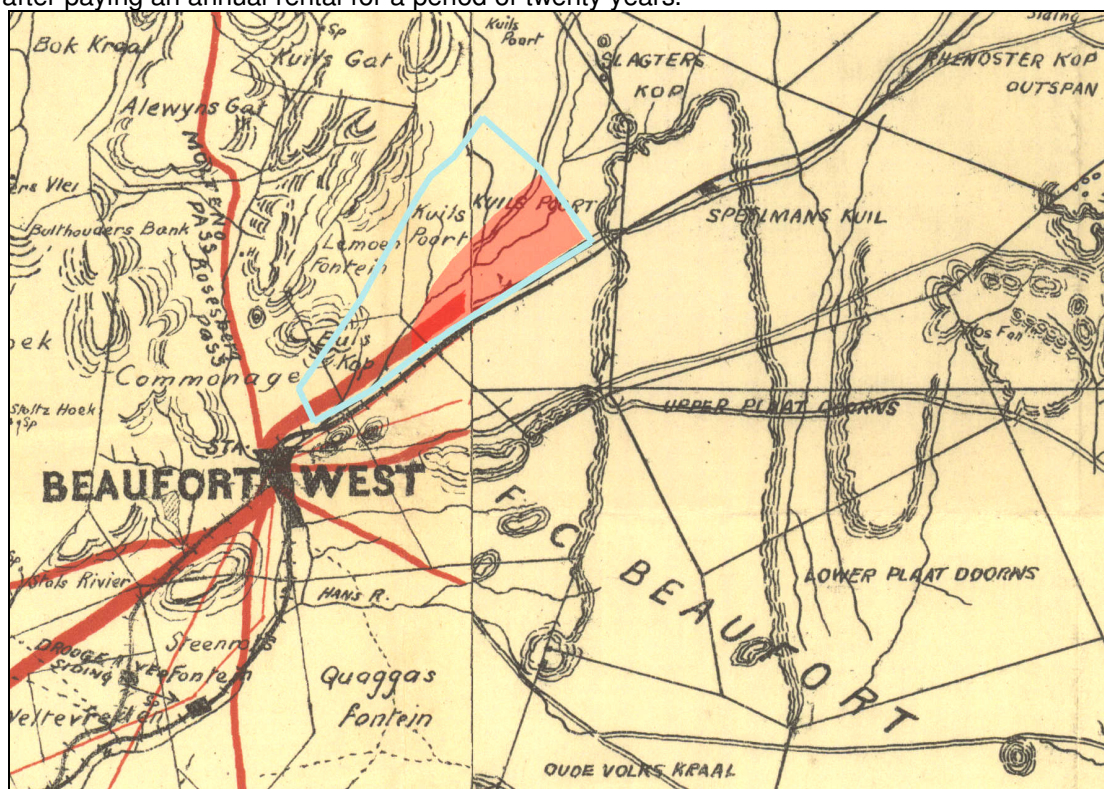


Figure 2: Extract from 1880-1890 compilation of SG Maps – subject development site boundary in blue, proposed development site hatched in red (Source: CDSM)

8.2 Anglo Boer War

British army camps were established in the Beaufort West region soon after the outbreak of the Anglo-Boer war in 1899. A camp was set up on the northern aspect of the dam site in order to be near a water source. Another was positioned across the Kuy's River on the eastern side of town and a third between the Gamka River and the railway station. The fourth camp was positioned south of the town on the farm Weltevrede and housed approximately 800 soldiers. It was not established how many soldiers were stationed in Beaufort West altogether. 25 British war graves are said to be present in the Beaufort West town cemetery indicating that military contact took place in the district⁸.

⁵ Sources consulted:- *The Shaping of South African Society 1650 – 1840*; Edited by Richard Elphick and Hermann Gilomee, Maskew Miller 1992. ; *Moodie The Recort* : Reprint Balkema 1955: *Kaapse Archiefstukken 1781, 1782, 1783*; Kathleen Jeffreys, *Cape Times Bep.* 1931. *Resolutions of the Cape*; www.tanap.net. MOOC series; www.tanap.net.

⁶ Desktop archive :

⁷ Cape Town Archives: *Loan Farm Indices. RLR series.*

⁸ www.communitywalk.com/beaufort_west

Six blockhouses were erected for the duration of the war of which five were apparently demolished when the war ended in 1902. Although the position of these blockhouses is not known, it is presumed that they were positioned on the tops of hillocks and served as look-out points⁹. No evidence was found in the documentation consulted, of military contact or conflict having taken place on the farms being researched. Any number of artefacts relating to this period of conflict may be present on the ground.

It was felt necessary to spend a fair amount of time assessing the possibility of graves being present on the sites under review. While the possibility cannot be ruled out, no firm archival evidence was found confirming victims of struggle interments on the site. Similarly, no archival and/or oral history sources pertaining to possible socio-political themes relating to former use of a portion of the property by the SAPS could be identified or located.

8.3 **Deeds search**

The research included a Deeds Office search relating to former ownership and subdivision transactions for each of the four properties. Copies of original S.G. Diagrams for each of the four farms are attached as part of Annexure 7.

Bulskop 163/1

1894: Quitrent grant nr 15/9 dated 27th March in favour of Municipality of Beaufort West 1/3 Hendrik Johannes de Jager 1/3, Arthur Shute Piers 1/3. Extent: 8,021 hectares;

1894: Portion 1 deducted in favour of Municipality of Beaufort West. Title 4397/1894 dated 7th August.

Kuilsport 161/9

1841: Quitrent grant number 6/18 dated 15th April in favour of Joseph Wood. Extent 12737 Morgen 250 rds (10910 hectares);

1842: J M Mynard. Title 1249/1842 dated 21st October. Amended Title in favour of W H Allhusen dated 13th October 1909. No Title number listed on Erf Register. No further information found;

2008: Municipality Beaufort West Title 17758/2008. To date this transaction has not been captured in the Surveyor Generals Office.

Lemoenfontein South 162

1909: William H Allhusen. Beaufort West Freeholds 3.1 dated 30th September. Extent 2294 morgen 234rds (1,965 hectares)

1922: Francisus Jacobus Weitz

From 1922 onwards, transactions continued on the same Title Deeds as with Lemoenfontein.

9. HERITAGE RESOURCES & ISSUES

With relation to the integrated mapping of all heritage resources and/ or occurrences noted on the site please note that:

- Integrated heritage resource mapping, including visual-spatial issues, the built environment, archaeological and palaeontological occurrences are presented through Annexure 8;
- Archaeological, Palaeontological and Visual aspects highlighted through the respective specialist inputs, which have been transposed into this report have been included on the above mapping where possible. Please however refer to respective specialist reports for detailed mapping and visual presentations.
- Again, note differentiation in this report (Figure 1) to the overall development site (red line) and the northwest section (un-hatched area), the latter of which is the subject of separate EIA and HIA applications for a Wind Farm (adjudicated by HWC's IAcorn on 2nd November 2011.

⁹ Vivier, W.G.H. & S. 1969. *Hooyvlakte: Die verhaal van Beaufort-Wes 1818-1968*. Nasionale Boekhandel.

9.1 Built environment

Structures noted within the boundaries of the overall development site but outside the boundaries of the proposed Photovoltaic Park included a cluster of structures located on the remainder of the farm Lemoenfontein South 162, roughly in the centre of the overall site as indicated on mapping attached (Annexure 8). These were the former farmstead, former labourer's cottages, agricultural outbuildings and associated structures as listed in the table and annotated with recent aerial photograph below:

GPS #	Coordinates	Description	> 60 yrs of age
139	S32 17.947 E22 38.047	Agricultural outbuilding and stores	No
140	S32 17.921 E22 38.094	Former farmstead/ SAPD office	Yes (*)
141	S32 17.921 E22 38.094	Outbuilding occupied by resident	No
143	S32 17.957 E22 38.120	Agricultural outbuilding/ shed	No
144	S32 17.881 E22 38.097	Cement dam	No
145	S32 17.868 E22 38.093	Small pump house/ store for gas tanks	No
146	S32 17.836 E22 38.137	Old cattle dip	No
147	S32 17.782 E22 38.222	Informal structures: pig sty	No
148	S32 17.855 E22 38.053	Labourer's cottage	No
149	S32 17.856 E22 38.034	Labourer's cottage	No
150	S32 17.871 E22 38.023	Labourer's cottage	No

(*) Historic core likely older than 60 years

As per the deeds search, this property was transferred to the Beaufort West Municipality during 1984. The farmstead and outbuildings fell into disuse when the former owner, Petrus Erasmus Oosthuizen, vacated the property until being occupied by the South African Police Service livestock theft prevention unit between February 1995 and January 2001.¹⁰

Two buildings directly northeast of the farmstead (No's 148, 149) were formerly used as two labourer's cottages while a larger third structure (No. 150) had been divided internally into four smaller residential units – each with a hearth, door and windows, save for two smaller units to which no windows have been fitted. Magazine articles pasted on the internal walls of No. 148 suggest that this unit may have been occupied until c. 2003. As evident from the photographs attached (Annexure 3), all buildings are either derelict or in state of disrepair.

None of the abovementioned buildings located on the overall development site (but outside the boundaries of the proposed Photovoltaic Park) is considered to be of historical, aesthetical, architectural or socio-historic significance. We could not locate any other structures (including ruins, foundations, public memorials and/or gravesites) on the site.

While not "structures" in the strictest sense, made-made occurrences noted across the overall development site include linear accumulations of loosely-packed stone features, the locations of which are indicated on the heritage resource mapping (Annexure 8). We note that the location of these features, which coincides with 1:50,000 mapping for the area¹¹, are located within and orientated perpendicular to, natural drainage lines on the site and most likely served as measure against excessive sheet wash and erosion. Although these features contribute to the overall "agricultural use/ cultural landscape theme", they are considered to be of low cultural significance.

Situated 2,5km northeast of the site boundary at an elevated location along the lower slopes of the Nuweveld Mountains and overlooking the southwest portion of the site, the Lemoenfontein Game Lodge is a historic farm residence constructed in the 1850's. Originally built by an English nobleman as a hunting retreat, the farmstead is currently used as a guesthouse and remains largely unchanged and has been well maintained (Annexure 3). While no heritage inventory has been drawn up for the Beaufort West area, the building is considered to be of high local cultural significance. This resource will not be affected through the proposed Photovoltaic Park.

¹⁰ Mr. le Roux, Beaufort West Municipality Electro-Technical Department, 6th July 2011

¹¹ 1:50,000 Topocadastral 3222BC Beaufort West, CDSM



Figure 3: Recent aerial view of building cluster (former farmstead/ formerly occupied by the SAPD), located roughly in centre of overall development site (Source: GoogleEarth)

The location of a new substation and related infrastructure required as part of the proposed development, which will follow existing overhead lines/ registered servitudes between the existing Droërivier and Noordeinde substations, would not affect any heritage resources.

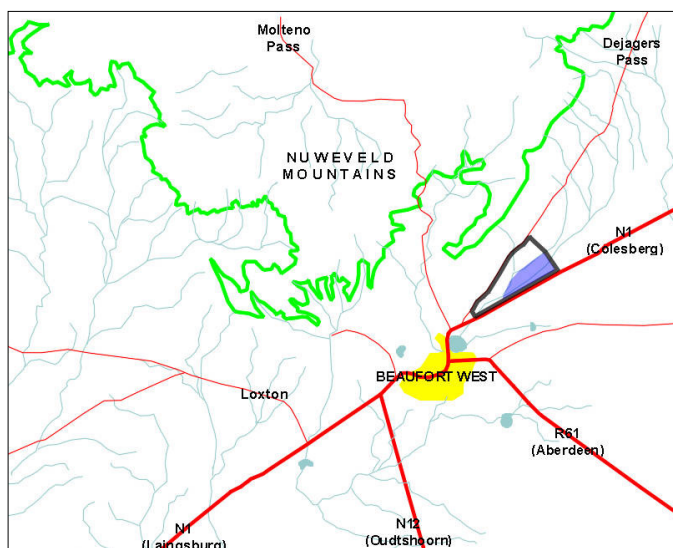
9.2 Landscape issues

9.2.1 Regional & Natural landscape setting

The proposed development site is located along the foothills of the Nuweveld Mountains, which form a scarp reaching an elevation of well over 1,000m above mean sea level in places. These mountains overlook an arid Karoo landscape consisting mostly of open plains interspersed by series of low hills resulting in an undulating landscape character, which to the east, extends towards the Swartberg range.

The greater part of the site consists of flat pans underlain by beds of mostly mudstone, siltstone, shale and sandstone of the Beaufort Group, and overlain by alluvial deposits of silt, sand and gravel. These alluvial soils are calcareous and have variable plant nutrient status. They are also weakly structured and highly erodible. The vegetation on the properties fall into two broad vegetation types: Southern Karoo Riverine Thicket (e.g. *Acacia karoo* (Sweet Thorn trees along drainage lines) and Gamka Karoo (occurring along stone outcrops, as well as on the alluvial plains - both dominated by dwarf shrubs).¹²

¹² Ken Coetzee, of Conservation Management Services, July 2009



The plains around the Nuweveld Mountains have clearly been eroded over time by a number of rivers and its lesser tributaries, including the Gamka River, Hans River and Kuils River but none of these are perennial and the landscape remains dry. The site is traversed by the southwest-flowing Kuilspoortspruit, which has scoured this area directly south of the adjoining mountain range through a network of shallow natural drainage lines.

Figure 4: Diagram illustrating site (blue hatching) in relation to major regional landscape and man-made features, including urban areas, N1 route and other secondary routes

9.2.2 Cultural landscape context

The term “*cultural landscape*” refers to the imprint created on a natural landscape through human habitation and cultivation over an extended period of time. While the Cape has been inhabited for many ten of thousands of years (pre-colonial history) prior to Western settlement (colonial history), the nomadic lifestyles of early inhabitants are not always as evident within the landscape than the significant imprints made by humans during the last two – three hundred years. Unlike ancient landscapes in parts of the world where intensive cultivation over periods much longer than locally have allowed natural and cultural components of the landscape to become interwoven, climatic conditions prevailing with arid Karoo landscape mostly precluded large-scale cultivation, save within the proximity of perennial rivers or places with a reliable water source.

Ultimately, definition of a cultural landscape is informed by the following elements, weighed through professional opinion, public values and statutory (legal) framework:

- Natural Landscape
- Public Memory
- Social History
- Historical Architecture
- Palaeontology
- Archaeology

Analysis of early aerial photography for the Beaufort West area (Flight Series 90 of 1945 – Figure 5) reveals the following traditional (i.e. Pre-Modern) cultural landscape patterns on the overall development site and its environs:

- Limited cultivation is legible within the landscape, directly south of the farmstead;
- Number of linear features, orientated perpendicular to natural drainage lines being part of the Kuilspoortspruit and generally northeast of the farmstead are visible within the landscape;
- Alignment of the historic “Main Road to Interior”, depicted as green line on SG Diagram 6/1872 (Annexure 7), is highlighted as yellow line on the image and is now the northern boundary of the proposed development site (Provincial District Road DR2311 or the “De Jagers Pass Road”);
- Alignment of unnamed historic road, depicted as red line on same SG Diagram now replaced by N1 National road reserve;
- Locality of historic Lemoenfontein farmstead highlighted as yellow dot north of the site.

Further to the above, recent aerial photography of area within proximity of the farmstead clearly highlights the following former land use patterns that remain within the current landscape:

- Former cultivated fields directly south of farmstead (remains of modern irrigation system noted here during fieldwork);
- Main farm access road leading from farmstead in eastern direction towards old “Main Road to Interior”, now northern boundary of proposed development site;
- Remains of formerly cultivated fields located on eastern side of Kuilspoortspruit natural drainage line, on either sides of farm access road;
- Various narrow tracks diverge from this area.

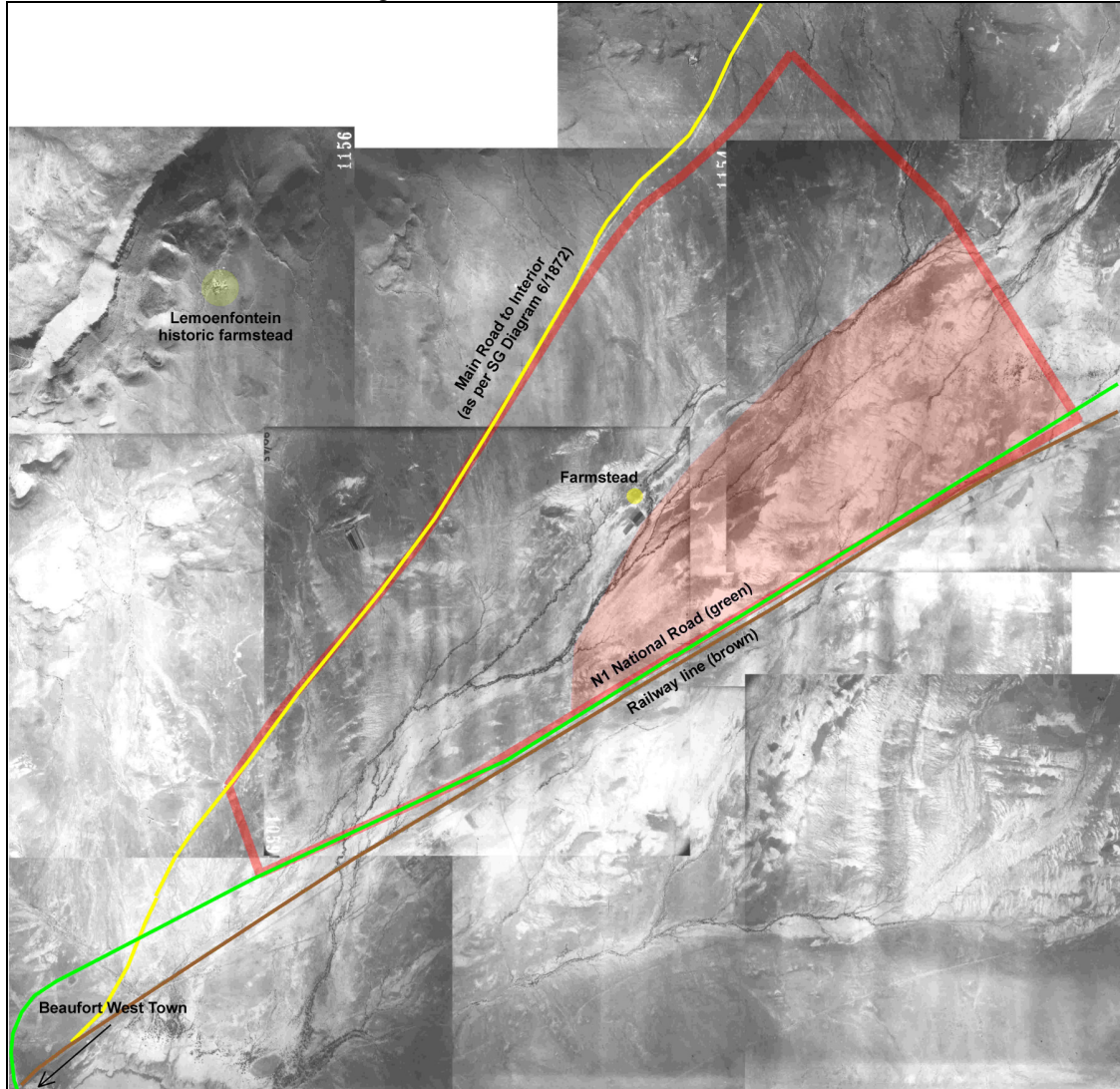


Figure 5: Collage compiled from 1945 aerial photography (not geo-referenced) highlighting proposed development site (red hatching) indicating its farmstead as well as historic road and historic Lemoenfontein farmstead (Source: Flight Series 90 of 1945, CDSM)

As mentioned, the location of a new substation and related infrastructure required as part of the proposed development will follow existing overhead lines/ registered servitudes between the existing Droërvier and Noordeinde substations (refer to locality plans attached as part of constraints mapping, Annexure 5). Given the occurrence of an established route alignment for overhead lines across the landscape and the fact that this element of the proposal would not deviate from this alignment, we are of the view that this part of the proposal would not detract from the overall landscape quality of the area.

9.2.3 Urban context

The development site is located c. 5km northeast of the Beaufort West town centre within a predominantly rural landscape. It is directly opposite the Beaufort West aerodrome and Karoo Gateway Lodge. We are aware that a proposal to extend the existing aerodrome runway is

currently underway and future expansion of facilities around the aerodrome is envisaged. An existing agricultural smallholding area directly opposite the site (and aerodrome) includes approximately 21 smallholdings. The development site is c. 2km east of a large truck stop situated along N1 National Road and directly opposite the existing Noordeinde substation.

9.3 **Visual-Spatial issues**

This Section have been transposed from, and should be read in conjunction with, the Visual Impact Assessment (VIA) compiled by *VRM Africa*, attached to this report as Annexure 9.

9.3.1 Recommendation and Conclusion

The regional scenic quality is defined as **Moderate to High**: the moderate areas due to the associations with the urban context of the northern extent of the town of Beaufort West. The areas outside of the urban context are strongly associated with the Karoo cultural landscape and as such, although widespread, are more likely to be recognised as a special area. The site is predominantly flat.

The Kuilspoortspruit, which flows along the length of the property, is the main feature that defines the site landscape character. The other main features associated with the site are: the close proximity to the N1 highway located to the south and the clear views of the escarpment and associated eco-tourism areas located to the north. Half of the site falls within the foreground / middle ground of the town of Beaufort West where a more developed landscape is beginning to be recognised. The property is degraded and the dwellings are in a very run down state and the areas that are in close proximity to the N1 already have a “road” sense of place created by visual disturbance of the moving traffic and associated noise. The land use options of the site are limited due to the lack of viable agriculture (refer to Agricultural Potential Assessment) and the close proximity of the site to the N1, which does detract from the landscape character.

The extent of the project viewshed for Alternative One (*60MW Concept Two*) was defined as **Moderate** with a **Low** extent for Alternatives Two and Three due to the decrease in height. The viewshed is contained to the north by the Nuweveld mountains which reach a height of 1260 m above sea level. There are also some elevated ridgelines to the SW of the site, which restrict views to the south of Beaufort West. Five receptors were identified in the study with the N1 receptors north and southbound having high levels of exposure (within 2km). The Lemoenfontein guest lodge, which is an important heritage resource, would have Moderate to Low levels of exposure.

The 4.367 metre height of the PV panels (including the structure) for Alternative 1 which will create a massing effect has the potential to generate high levels of visual contrast in the high exposure areas, which does include the N1 receptors. Due to the importance of the N1 as a view corridor, this alternative is not recommended.

It is the recommendation of this study that the Alternative Three type panel is suitable as the lower height of 2.89m allows for the local acacia karoo trees to generate partial visual screening. In conjunction with the reduced height, this option also has a smaller footprint where the slightly elevated northern section (included in the other alternatives) is excluded which reduces the zone of visual influence. The higher height of PV in Alternative One (4.367m), within the same geographic extent, would detract from the background mountain views as no partial screening from the surrounding vegetation would take place and the existing sense of place, which does have value, would be changed.

9.3.2 Project description findings

- In the high exposure areas the combination of the 4.5 metre height (including structure) and the massing of the PV panels has the potential to generate high levels of visual contrast. This has the potential to alter the sense of place in the Foreground / Middle Ground areas;

- The glint and glare can significantly increase the visual intrusion for highly exposed receptors. This would mainly be for receptors north of the project area.

9.3.3 *Planning key finding*

- The Beaufort West IDP makes provision for the establishment of an investment vehicle to attract funding for the provision of electricity by means of alternative energy sources.

9.3.4 *Regional landscape findings*

- The “Great” escarpment is a significant landscape feature and the mountainous area to the north of Beaufort West is used for eco-tourism activities. In order to protect the visual resources of the area, it is recommended that a two kilometre visual buffer is maintained (from the escarpment) in which the landscape context should remain the same;
- Receptors using this area for eco-tourism activities would be sensitive to landscape changes, which would detract from the wilderness landscape context and sense of place. The activity nodes within this buffer zone should be identified as Key Observation Points. (See Plate 15 in VIA, Annexure 9);
- The N1 is a significant tourist view corridor. A minimum of a 250 metre visual buffer next to the highway should be maintained in the areas outside the visual context of the town landscape;
- The Karoo National Park is an important tourist destination, having significant landscape character, which needs to be preserved. It is recommended that a two kilometre visual protection buffer be defined around the boundary to protect the visual resources of the park.

9.3.5 *Site landscape character findings*

- The site is predominantly flat. The Kuilspoortspruit, which flows along the length of the property, is the main feature that defines site landscape character. The other main features associated with the site are the close proximity to the N1 highway located to the south and the clear views of the escarpment and associated eco-tourism areas located north of the site;
- Half of the site falls within the foreground / middle ground of the town of Beaufort West where a more developed landscape is beginning to be recognised;
- The property is degraded and the dwellings are in a very run down state;
- Areas in close proximity to the N1 already have a “road” sense of place created by visual disturbance of the moving traffic and associated noise;
- The vegetation on the site adds value to the landscape character. Vegetation recommendations of the Biodiversity Sensitivity Analysis should be implemented;
- Land use options for the site are limited due to the lack of viable agriculture (refer to Agricultural Potential comment) and the close proximity of the site to the N1, which does detract from the site’s landscape character.

9.3.6 *Viewshed findings*

Based on findings of the site visit and the viewshed analysis generated from the DEM, viewsheds for the PV Alternatives Two and Three are defined as **Low** and are contained within the local context. Alternative One viewshed extent is **Moderate**. The extent of the viewshed is contained to the north by the Nuweveld mountains which reach a height of 1260 m above sea level. There are also some elevated ridgelines to the SW of the site, which restrict views from the south of Beaufort West.

The following receptors and landscape features were identified as being included in the viewshed of the proposed component landscape modifications:

- Receptors: N1 receptors (northbound and southbound) and Lemoenfontein Guest House;
- Significant landscapes: Great escarpment of the Nuweveld mountains to the north of the site.

9.3.7 *Exposure findings*

N1 receptors (north and southbound) were considered to have high exposure, while the Lemoenfontein receptors (north of site) and smallholding receptors (south of site) were considered as having moderate exposure.

9.3.8 *Receptor sensitivity findings*

The following Key Observation Points (KOPs) were identified in relation to the proposed landscape modifications (see in Plate 17 and Plate 18 in VIA, Annexure 9):

- Lemoenfontein Game Lodge;
- N1 Northbound;
- N1 Southbound.

9.3.9 *Landscape sensitivity findings*

- It was found that receptor sensitivity to the current landscapes would be **Moderate to High**. The close proximity of the N1 and the visual context created by the northern extent of the town would reduce the sensitivity of receptors to the proposed landscape modification and the landscape sensitivity of the site is defined as **Moderate**;
- **High** sensitivity areas are in close proximity to the escarpment with its high levels of landscape character adding significantly to the wilderness sense of place. These areas are more associated with eco-tourism activities. A change in land use could threaten these. For similar reasons the landscapes of the Karoo National Park (KNP) are also rated **High**;
- The majority of the other surrounding landscapes were defined as having **Moderate** sensitivities as they are more associated with the urban context of the town of Beaufort West. The areas outside of the urban context are strongly associated with the Karoo cultural landscape and as such, although widespread, are more likely to be recognised as a special area.

9.3.10 *VRM sensitivity mapping findings (Refer to Annexure 9.2, Plate 15)*

CLASS I: Landscape type where the visual objective is to preserve the existing character of the landscape where the level of change to the characteristic landscape should be very low and must not attract attention:

- Karoo National Park

CLASS II: where the objective is to retain the existing character of the landscape and the level of change to the characteristic landscape should be low but should not attract the attention of the casual observer:

- The escarpment and Karoo National Park 2km buffer areas;
- The areas outside of the Beaufort West landscape context (approx. 6km foreground/middle ground buffer) where the Karoo landscape defines a sense of place that needs to be controlled

CLASS III: where the objective is to partially retain the existing character of the landscape where the level of change to the characteristic landscape should be moderate and may attract attention but should not dominate the view of the casual observer:

- The Beaufort West urban areas and the areas outside the town where the urban context is apparent (6km Foreground / Middle ground).

9.4 **Archaeology**

A copy of the Archaeological Impact Assessment (AIA), compiled by CHARM (Dr. Peter Nilsson), is attached as Annexure 10, the findings of which are summarised below¹³. Kindly refer to specialist's full report and recommendations.

There were no restrictions to the archaeological investigation and the entire study area was accessible on foot and open to inspection and assessment. No material culture or structural remains of historical significance were observed. Numerous isolated and very low-density

¹³ Nilssen, P (2011). *Archaeological Impact Assessment – Proposed Beaufort West Photovoltaic (Solar) Park: southern portion of properties; 2/158 Lemoenkloof, RE 9/161 Kuilspoor, RE 162 Suid-lemoenfontein and RE 1/163 Bulskop, Beaufort West, Western Province. Unpublished report, Mossel Bay*

scatters of Stone Age implements were identified and mapped. Fourteen occurrences of Stone Age origin were identified and are considered to be of medium to high significance.

The proposed positions of the sites for the Photovoltaic (solar) panels lie directly or partially over 5 significant archaeological occurrences. Four of these are avoided by the proposed alternatives and 2 additional sites were identified that lie within the areas proposed for the development. In his Palaeontological Impact Assessment Dr. Almond noted that subsurface archaeological materials occur in the study area.

Summary of potential impact on and loss of archaeological resources(*)

	With Mitigation	Without Mitigation
Extent	Local	Local
Duration	Permanent	Permanent
Intensity	Unknown	High
Probability	Medium	High
Significance	Medium to High	Medium to High
Status	Unknown	Medium to High
Confidence	Medium	High

Source: Table 3, AIA, CHARM, 2011

Based on results of the current study it is recommended that:

- Two additional, significant archaeological occurrences lie within the boundary of the proposed sites for the solar panels. All significant archaeological occurrences, as indicated in AIA, Figure 5 (also refer to integrated heritage resource mapping, Annexure 8), should be avoided in the final layout for the proposed activity.
- Surveyed areas (walk tracks) – with the exception of the 14 significant Stone Age occurrences – are suitable for the proposed activities provided that archaeological monitoring is implemented.
- The boundaries of 14 archaeological occurrences should be mapped and these sites should be protected, conserved and managed in perpetuity as prescribed in an Archaeological Conservation Management Plan (ACMP) to be drawn up for the proposed project.
- The proposed buffer area of 25 meters from archaeological sites must be determined after the boundaries of the 14 sites have been mapped and demarcated. In order to protect these sites, they should be enclosed with suitable materials such as a wooden palisade fence. This should form part of the “micro-siting” to be implemented after environmental authorisation and should be included in the Environmental Management Plan.
- Some archaeological sites (preferably waypoint 74) and a collection of artefacts in secondary context could be incorporated into the project for education and tourism purposes since this will add value and provide further attraction to the proposed activity. The specifics of this should be developed in an ACMP for the affected properties.
- Archaeological monitoring should be conducted by a professional archaeologist; during earthmoving activities so as to avoid or minimize negative impact on potential subsurface archaeological resources.

9.5 Palaeontology

A copy of the Desktop Palaeontological Impact Assessment (PIA), compiled by Dr. John Almond, is attached as Annexure 11, the findings of which are summarised below¹⁴. Kindly refer to specialist’s full report and recommendations.

The overall palaeontological sensitivity of the Beaufort Group sedimentary bedrocks in the Beaufort West area is *high* (Almond *et al.* 2008). These continental sediments have yielded one of the richest fossil records of land-dwelling plants and animals of Permo-Triassic age anywhere in the world. However, due to the extensive drift cover, potentially fossiliferous Beaufort Group bedrocks are at present hardly exposed at all within the broader study region

¹⁴ Pether, J (2011). *Palaeontological Impact Assessment (Desktop study) – Proposed Photovoltaic Power Station, Beaufort West Municipality, Western Cape*. Unpublished report, Cape Town

to the north east of Beaufort West (Almond 2010b). Rare exceptions are occasional shallow dams and borrow pits outside and to the north of the PV power station study area where low diversity trace fossil assemblages are recorded in association with sandstone palaeosurfaces and overbank mudrocks.

Deep bedrock excavations are unlikely to be required for PV panel support structures, electricity power lines, underground cables and ancillary developments such as access roads. Given the extensive and moderately thick cover of superficial sediments (alluvium, surface gravels) of low palaeontological sensitivity within the study area, the proposed alternative energy development does not pose a serious risk to local fossil heritage. Specialist palaeontological mitigation for this project is therefore not considered necessary.

It is recommended that:

- The ECO responsible for the development should be aware of the possibility of important fossils being present or unearthed on site and should monitor all substantial excavations into fresh (*i.e.* unweathered) sedimentary bedrock for fossil remains;
- In the case of any significant fossil finds (*e.g.* vertebrate teeth, bones, burrows, petrified wood) during construction, these should be safeguarded - preferably *in situ* - and reported by the ECO as soon as possible to the relevant heritage management authority (Heritage Western Cape) so that any appropriate mitigation by a palaeontological specialist can be considered and implemented, at the developer's expense;
- These recommendations should be incorporated into the EMP for the Beaufort West Photovoltaic Power Station project.

9.6 **Eco-tourism**¹⁵

One of the goals of ecotourism is to offer tourists insight into the impact of human beings on the environment, and to foster a greater appreciation of our natural habitats and from an economic perspective, heritage resources may prove to be valuable resources when used in sustainable manner through eco-tourism. This may for example include investment in adaptive reuse of historic buildings so as to conserve and enhance the unique character and historic themes pertinent to this area. Heritage tourism can therefore serve as a driver for economic development, including infrastructure development and poverty alleviation through job creation. The area's rich archaeological, palaeontological, historical and natural heritage has the potential to provide unique tourism opportunities when developed and used in responsible and sustainable ways.

Existing eco-tourism related activities present within the direct proximity of the overall development site includes activities offered by the Lemoenfontein Game Lodge and the nearby Karoo National Park and include *e.g.* walking trails along escarpment, hunting, horse back riding, mountain biking, bird watching, paragliding, etc. Further potential heritage-related eco-tourism opportunities associated with the development site include archaeology, palaeontology and regional landscape/ wilderness qualities.

While the proposed development would transform the site, the wealth of wind and solar resources in the Beaufort West area, which likely to increase in number in the future; other elements pertaining to its urban context (refer Section 9.2.3) and its distance from the Karoo National Park, we do not consider that the proposed Photovoltaic Park would have a detrimental impact on eco-tourism in the region. Rather, we are of the view that, taken in conjunction with the adjoining wind farm, the proposal offers opportunities for education and tourism pertaining to renewable energy generation in the region.

Important to note in this regard is also the recommendation contained in the AIA (Annexure 10, Section 9.4) to the effect that a collection of artefacts in secondary context could be incorporated into the project for education and tourism purposes.

¹⁵ Section included in accordance with requirements set by National Department of Environmental Affairs

10. HERITAGE INFORMANTS AND INDICATORS

According to the requirements of Section 38(3) of the NHRA it is crucial that the land use planning and EIA processes be informed by and incorporate heritage informants and indicators (as done through the mapping and grading of relevant heritage resources in Section 9 of this report). It is the purpose of this Section to define heritage informants and indicators pertaining to the way in which heritage resources must be incorporated into the overall design of the proposed development and should therefore be read in conjunction with Annexure 8 (Integrated Mapping summarising Visual issues and Design indicators).

10.1 *Built environment issues*

- While situate on one the farm Lemoenfontein South 162/ Remainder, none of the structures surveyed as part of this HIA are older than 60 years, nor will they be affected by the proposed development (refer Section 9.1) Archival and other reference sources does not highlight and heritage-related themes in relation to any remaining structures;
- The proposed development would not significantly affect existing views from the historic Lemoenfontein farmstead (an off-site resource), which is considered to be of moderate to high local cultural significance, across the adjoining Karoo landscape.

10.2 *Landscape issues*

- From a regional and natural landscape perspective, the escarpment partly formed by the Nuweveld Mountains are considered to be of high significance and a 2km buffer within which no development/ landscape modification should be permitted, is therefore recommended (this however falls outside the ambit of the proposed development site);
- The N1 is a significant tourist view corridor and a 250 meter visual buffer next to the highway should be maintained in the areas outside the visual context of the town landscape;
- The Karoo National Park represents a Karoo wilderness landscape character, which is of high significance and may not be impacted upon. The VIA recommends that two kilometre visual protection buffer be defined around the Park boundaries so as to protect the visual resources of the Park (this however falls outside the ambit of the proposed development site);
- With relation to the installation of a transmission power line linking the proposed control building to the new substation (beside the existing Noordeinde substation, over the N1), then to the existing Beaufort substation and finally the existing Droërvier substation (beside the N12), it is noted that this power line (c. 14.9km), will run within an existing servitude alongside an existing overhead power line. Therefore, given this context, we do not consider this component of the proposal to have a significant impact on the already-transformed landscape character of the area.

10.3 *Visual-spatial issues*

- Recommendations pertaining to visual buffer areas identified in Section 10.2 above should be implemented.

10.4 *Archaeology*

All recommendations contained in AIA, as summarised in Section 9.4 of this HIA report shall be adhered to, subject to any amendments to the significance assessment and heritage indicators that may be required by the findings of recommended mitigation during archaeological monitoring.

10.5 *Palaeontology*

All recommendations contained in PIA, as summarised in Section 9.5 of this HIA shall be adhered to, subject to any amendments to the significance assessment and heritage indicators that may arise from findings or recommendations arising through archaeological and ECO monitoring during construction/ excavations.

10.6 *Eco-tourism*

- Opportunities for education and tourism pertaining to renewable energy generation as well as archaeological- and palaeontological occurrences on the site and its environs should be investigated and provided for – whether on-site or as part of another suitable public venue in the area;
- Some archaeological sites (preferably waypoint 74) and a collection of artefacts in secondary context could be incorporated into the project for education and tourism purposes since this will add value and provide further attraction to the proposed activity. The specifics of this should be developed in an ACMP for the affected properties.

11. PUBLIC PARTICIPATION

Due to the fact that there are no known local heritage conservation bodies in the Beaufort West area (registered as such with Heritage Western Cape in terms of Section 25 of the National Heritage Resources Act, 1999 (Act 25 of 1999)), the Public Participation Process (PPP) for this HIA was coordinated with that of the EIA Process facilitated by *Cape Environmental Assessment Practitioners (Pty) Ltd* (Cape EAPrac) in terms of the National Environmental Management Act, 1998 (Act 107 of 1998), from the outset.

11.1 *Environmental Scoping Phase*

The heritage-related specialist studies listed below were included in the Draft Scoping Report, which was advertised and made available to the public for review and comment for a period of 40 days and subsequently submitted/ accepted by the Department of Environmental Affairs (DEA). Note these reports were also made available on the *Cape EAPrac* website (www.cape-eaprac.co.za/project.htm):

- Draft (Scoping) Archaeological Impact Assessment (*);
- Draft (Scoping) Palaeontological Impact Assessment (*);
- Draft Visual Impact Assessment;
- Historical background/ archival research;
- Heritage Statement compiled as part of NID.

(* Note that the Terms of Reference of these specialist studies were agreed with HWC's Archaeology Section, Ms. Belinda Mutti prior to the commencement with initiation of the application.

No heritage-related comments were submitted to *Cape EAPrac* and/or *Perception Heritage* as part of this phase of the PPP.

11.2 *Environmental Impact Assessment Phase*

The Draft Environmental Impact Report, including the integrated HIA, was made available to the public on 15th November 2011 for a review and comment period extending from 15 November 2011 to 13 January 2012. Heritage Western Cape (Ms. Jenna Lavin) was provided with a notification letter in this regard as well as a CD copy of the full DEIR document.

Registered I&APs were provided with notification directing them to the venues where the hard copies of the DEIR are available as well as *Cape EAPrac* website. Stakeholders/State Departments/ Organs of State were provided with CD copies along with their notification letters. DEA&DP, Cape Nature and Dept. of Agriculture were also provided with hard copies of the main report and relevant specialist reports. Proof of this PPP is attached as part of Annexure 12 to this report. To date, no heritage-related comments have been submitted to *Cape EAPrac* and/or *Perception Heritage* as part of this phase of the PPP.

12. ASSESSMENT OF IMPACTS

This Section serves to assess conformity of the proposal (*60MW Concept Two, Annexure 6*) to the key heritage design informants and indicators identified in Section 10 above. Where possible, each indicator is assessed individually for ease of reference. A comparative analysis of the perceived significance of impacts on heritage resources is attached as Annexure 12 to this report.

12.1 Indicators relating to Built environment issues

a.) INDICATOR BE-1: Proposed development should not alter views from historic Lemoenfontein Game Lodge.

Assessment:

The historic farmstead's elevated location results in extended views across the adjoining Karoo landscape with the town of Beaufort West in the Middle/ Background to the south (right) and westernmost portion of the subject site in the Middle ground to the southeast (left). Views to the eastern portion of the overall development site/ site for proposed Photovoltaic Park are however obscured by vegetation in a terraced garden directly in front of the farmstead.

The proposal would not have a significant impact on views from the historic homestead (No impact).

12.2 Indicators relating to Landscape issues

a.) INDICATOR L-1: The N1 is a significant tourist view corridor and a 250 meter visual buffer next to the highway should be maintained in the areas outside the visual context of the town landscape.

Assessment:

The 4.367 solar panel height of Alternative One would create a massing effect and high levels of visual contrast in high exposure areas (e.g. from N1 KOP's), the 2.89m solar panel height as proposed with Alternative Three would be more appropriate at this location. Within this geographic extent (i.e. relatively flat landscape, the 4.367m high solar panels would detract from the background mountain views as no partial screening from the surrounding vegetation would take place and the existing sense of place, which does have value, would be changed. The 2.89m height option would however be acceptable and allow for partial visual screening from the N1 by existing Karoo acacia trees occurring on the site. It is recommended that at least a 250m visual buffer be maintained along the N1 (also refer to Section 12.3).

That the 2.89m solar panel option in conjunction with the 60MW Concept Two (Alternative Three) be implemented for the proposed development (Condition of approval).

12.3 Indicators relating to Visual-spatial issues

a.) INDICATOR VS-1: Recommendations pertaining to visual buffer areas identified in Section 10.2 above should be implemented.

Assessment:

The two kilometre visual buffers relating to the Nuweveld Mountain escarpment and Karoo National Park would not be affected by the proposed development. A 250m visual buffer is however recommended along the N1, which is considered appropriate.

A 250 meter visual buffer along the N1 National road shall be maintained in the areas outside the visual context of the town landscape (Condition of approval).

12.4 Indicators relating to Archaeology

All recommendations contained in AIA, as summarised in Section 9.4 of this HIA report shall be adhered to, subject to any amendments to the significance assessment and heritage indicators that may be required by the findings of recommended mitigation during archaeological monitoring *(Condition of approval)*.

12.5 Indicators relating to Palaeontology

All recommendations contained in PIA, as summarised in Section 9.5 of this HIA shall be adhered to, subject to any amendments to the significance assessment and heritage indicators that may arise from findings or recommendations arising through archaeological and ECO monitoring during construction/ excavations *(Condition of approval)*.

12.6 Indicators relating to Eco-tourism

a.) INDICATOR T-1: Opportunities for education and tourism pertaining to renewable energy generation should be investigated.

Assessment:

Whereas the intention of this indicator is not to be descriptive as to the location or venue for implementation of future educational and tourism opportunities with relation to renewable energy on the site, it should be considered as an opportunity. The developer may provide for such facility on-site or otherwise elsewhere as part of an existing public venue in the Beaufort West area.

The developer should investigate opportunities for education and tourism pertaining to renewable energy generation (Potential positive impact).

b.) INDICATOR T-2: Collection of archaeological artefacts could be incorporated into the project for educational and tourism purposes.

Assessment:

Refer to Section 10.6. The specifics of such collection and presentation for educational and tourism purposes should be set out in an Archaeological Conservation Management Plan (ACMP).

The ACMP shall be compiled by a suitably qualified, experienced archaeologist and include recommendations with relation to the possible collection and presentation of any archaeological artefacts for educational and/or tourism purposes. (Condition of approval/ Positive impact).

12.7 Summary of recommended conditions of approval

As illustrated through the perceived significance of potential impacts on heritage resources before and after mitigation (Annexure 12), we are of the view that the 60MW Concept Two (Alternative 3) would have no significant impact on heritage resources on or within the direct proximity of the site.

Indicator Ref	Recommended HWC Conditions of Approval
L-1	That proposed 60MW Concept Two (Alternative Three) be implemented for the proposed development
VS-1	A 250 meter visual buffer along the N1 National road shall be maintained in the areas outside the visual context of the town landscape
Archaeology	Refer Sections 9.4 and 12.4
Palaeontology	Refer Sections 9.5 and 12.5
T-2	The ACMP shall be compiled by a suitably qualified, experienced archaeologist and include recommendations with relation to the possible collection and presentation of any archaeological artefacts for educational and/or tourism purposes

13. LIMITATIONS AND ASSUMPTIONS

- This report is limited to the assessment of the potential impact of the proposed Beaufort West Photovoltaic Solar Power Station on heritage resources found on the development site as defined in this Heritage Impact Assessment;
- There is a limitation in terms of understanding the cumulative impacts of the project when taken in conjunction with other similar future development projects in the Beaufort West area;
- While every precaution was taken to accurately represent the location and extent of heritage resources with GIS software through the integrated heritage resource mapping (Annexure 8), this should be considered for illustrative purposes only – primarily due to the scale at which it is presented here.

14. RECOMMENDATIONS

Having regard to the above assessment, it is recommended:

- 14.1 That this report fulfils the requirements of an Integrated Heritage Impact Assessment (HIA);

- 14.2 That the recommendations set out in Section 12 of this integrated HIA be incorporated into the proposed development and that that the Department of Environmental Affairs (DEA) be informed accordingly.

PERCEPTION Heritage Planning
24th November 2011

SE DE KOCK

B-Tech(TRP) MIPI TRP(IRL) EIA Mgmt (IRL) APHP