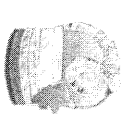


10

Archaeo-Info Northern Province

9/2/2006/0009



Archaeo-Info Northern Province  
PO Box 7296  
Tlohozandou  
0950  
TELEFAX: +27 (15) 9638409  
E-mail: [saphan@haramba.org](mailto:saphan@haramba.org)

9-2-284-0009-20061001-AINP

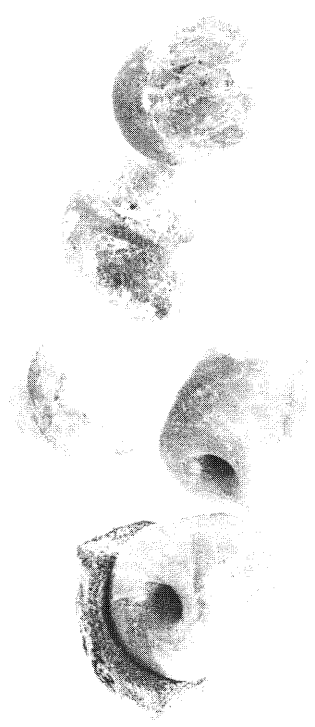
# Heritage Impact Assessment

Heritage Impact Assessment for the Proposed  
Power line near Grootpan, Ogies, Mpumalanga  
Province.

**PREPARED BY:**  
Archaeo-Info Northern Province

**PREPARED FOR:**  
Naledzi Environmental Consultants

August 2006



## Credit Sheet

### **Project Director**

Stephan Gaigher (BA Hons, Archaeology, UP)  
Principal Investigator for AINP  
Member of ASAPA  
Tel.: (015) 963 8409  
Cell.: 083 324 2714  
E-mail: [stephan@lajuma.com](mailto:stephan@lajuma.com)

### **Fieldworker**

Eric N. Mathoho (BA, Archaeology, Univen)  
Fieldworker for AINP  
Member of ASAPA

### **Report Author**

Stephan Gaigher

*Disclaimer: Although all possible care is taken to identify all sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the study. AINP and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.*

SIGNED OF BY: Stephan Gaigher

.....

## Management Summary

**Site name and location:** Proposed power line near Grootpan, Ogies in the Mpumalanga Province.

**Magisterial district:** Witbank District Municipality

**Developer:** ESKOM SA Ltd

**Consultant:** AINP, PO Box 7296, Thohoyandou, 0950, South Africa

**Date development was mooted:** June, 2006

**Date of Report:** 1 August, 2006

**Proposed date of commencement of development:** September, 2006

**Findings:** Provided the recommendations outlined in this report are followed the development of the power line can continue from a heritage management position.

# Table of Contents

Credit Sheet .....	2
Management Summary .....	3
Table of Contents .....	4
List of Figures, Tables & Appendices.....	5
Introduction.....	6
Proposed Project.....	6
Methodology.....	7
Inventory.....	7
Site Surveying .....	7
Survey Sampling .....	7
Systematic Survey Sampling.....	8
Judgemental Survey Sampling.....	8
Assessment.....	8
Site Evaluation.....	8
Significance Criteria.....	8
Assessing Impacts .....	9
Resource Inventory.....	13
Power line.....	13
Resource Evaluation.....	13
Power line.....	13
Impact Identification and Assessment .....	13
Power line.....	13
Resource Management Recommendations .....	13
Power line.....	13
Power line.....	13
References Cited .....	14

## List of Figures, Tables & Appendices

Table 1.	Site significance (Pre-Contact).....	12
Table 2.	Site significance (Post-Contact).....	12
Table 3.	Pre-contact site characteristics.....	13
Table 4.	Post-contact site characteristics.....	13
Appendix A	Photographs.....	18
	Photo 1 – Sub-station at Grootpan.	
	Photo 2 – Proposed area for development.	
Appendix B	Criteria for Pre-Contact Site Evaluation.....	20
Appendix C	Criteria for Post-Contact Site Evaluation.....	21
Appendix D	Criteria for Site Evaluation.....	24
Appendix E	Location Maps.....	26

## Heritage Impact Assessment

Power line near Grootpan, Ogies in the Mpumalanga Province.

### Introduction

Archeo-Info Northern Province (AINP) was contracted by *Naledzi Environmental Consultants* to conduct a Heritage Impact Assessment (HIA) on the proposed power line near Grootpan, Ogies, in the Mpumalanga Province.

This HIA forms part of the Environmental Impact Assessment (EIA) as required by the Environmental Conservation Act (ECA) 73 of 1989, the Minerals & Petroleum Resources Development Act, 28 of 2002 and the Development Facilitation Act (DFA), 67 of 1995. The HIA is performed in accordance with section 38 of the National Heritage Resources Act (NHRA), 25 of 1999 and is intended for submission to the South African Heritage Resources Agency (SAHRA).

Qualified personnel from AINP conducted the assessment. The team comprised a Principal Investigator with a minimum of an Honours degree in an applicable science as well as at least five years of field experience in heritage management assisted by a fieldworker with at least a BA degree in an applicable science. All of our employees are also registered members of the Association of South African Professional Archaeologists (ASAPA).

A member of AINP performed the assessment on 16 June 2006.

The extent of the proposed development sites were determined as well as the extent of the areas to be affected by secondary activities (access route, construction camp, etc.) during the development. The sites were plotted using a Global Positioning System (GPS) and photographed digitally. The sites were surveyed on foot.

All results will be relayed in this report, firstly outlining the methodology used and then the results and recommendations for the identified resources.

### Proposed Project

Grootpan Sub Station	26° 02' 43,3" S
	29° 65' 28,1" E
Crossing at tar road	26° 04' 50,3" S
	29° 05' 08,1" E
Proposed sub station	26° 05' 57" S
	29° 04' 26" E

Eskom Sa Ltd has proposed the construction of a new 132 KVa power line from the Grootpan sub station to a new proposed sub station near Goedgewonden. The proposed power line will be approximately 7km long with the new sub station utilising an area of approximately 1ha. The proposed site is approximately 4km east of the Mpumalanga town of Ogies.

After researching the National Archive records as well as the SAHRA records it was determined that no previous archaeological or historical studies have been performed in the demarcated study area.

The project was tabled during June 2006 and the developer intends to commence construction as soon as possible after receipt of the ROD from the Department of Environmental Affairs.

## Methodology

### Inventory

Inventory studies involve the in-field survey and recording of archaeological resources within a proposed development area. The nature and scope of this type of study is defined primarily by the results of the overview study. In the case of site-specific developments, direct implementation of an inventory study may preclude the need for an overview.

There are a number of different methodological approaches to conducting inventory studies. Therefore, the proponent, in collaboration with the archaeological consultant, must develop an inventory plan for review and approval by the SAHRA prior to implementation (*Dincause, Dena F., H. Martin Wobst, Robert J. Hasenstab and David M. Lacy 1984*).

Site surveying is the process by which archaeological sites are located and identified on the ground. Archaeological site surveys often involve both surface inspection and subsurface testing.

A systematic surface inspection involves a foot traverse along pre-defined linear transects which are spaced at systematic intervals across the survey area. This approach is designed to achieve representative areal coverage. Alternatively, an archaeological site survey may involve a non-systematic or random walk across the survey area. Subsurface testing is an integral part of archaeological site survey. The purpose of subsurface testing, commonly called "shovel testing", is to:

- (a) assist in the location of archaeological sites which are buried or obscured from the surveyor's view, and
- (b) help determine the horizontal and vertical dimensions and internal structure of a site.

In this respect, subsurface testing should not be confused with evaluative testing, which is a considerably more intensive method of assessing site significance (*King, Thomas F., 1978*).

Once a site is located, subsurface testing is conducted to record horizontal extent, depth of the cultural matrix, and degree of internal stratification. Because subsurface testing, like any form of site excavation, is destructive it should be conducted only when necessary and in moderation.

Subsurface testing is usually accomplished by shovel, although augers and core samplers are also used where conditions are suitable. Shovel test units averaging 40 square cm are generally appropriate, and are excavated to a sterile stratum (i.e. C Horizon, alluvial till, etc.). Depending on the site survey strategy, subsurface testing is conducted systematically or randomly across the survey area. Other considerations such as test unit location, frequency, depth and interval spacing will also depend on the survey design as well as various biophysical factors. (*Lightfoot, Keng G. 1989*).

Site survey involves the complete or partial inspection of a proposed project area for the purpose of locating archaeological or other heritage sites. Since there are many possible approaches to field survey, it is important to consider the biophysical conditions and archaeological site potential of the survey area in designing the survey strategy.

Ideally, the archaeological site inventory should be based on intensive survey of every portion of the impact area, as maximum areal coverage will provide the most comprehensive understanding of archaeological and other heritage resource density and distribution. However, in many cases the size of the project area may render a complete survey impractical because of time and cost considerations.

In some situations it may be practical to intensively survey only a sample of the entire project area. Sample selection is approached systematically, based on accepted statistical sampling procedures, or judgementally, relying primarily on subjective criteria (*Butler, W., 1984*).

A systematic sample survey is designed to locate a representative sample of archaeological or heritage resources within the project area. A statistically valid sample will allow predictions to be made regarding total resource density, distribution and variability. In systematic sample surveys it may be necessary to exempt certain areas from intensive inspection owing to excessive slope, water bodies, landslides, land ownership, land use or other factors. These areas must be explicitly defined. Areas characterized by an absence of power line access or dense vegetation should not be exempted. (*Dunneil, R. C., Dancey W.S. 1983*).

Under certain circumstances, it is appropriate to survey a sample of the project area based entirely on professional judgement regarding the location of sites. Only those areas which can reasonably be expected to contain archaeological or heritage sites are surveyed.

However, a sufficient understanding of the cultural and biophysical factors which influenced or accounted for the distribution of these sites over the landscape is essential. Careful consideration must be given to ethnographic patterns of settlement, land use and resource exploitation; the kinds and distribution of aboriginal food sources; and restrictions on site location imposed by physical terrain, climatic regimes, soil chemistry or other factors. A judgemental sample survey is not desirable if statistically valid estimates of total heritage resource density and variability are required (*McManamon F.P. 1984*).

## Assessment

Assessment studies are only required where conflicts have been identified between heritage resources and a proposed development. These studies require an evaluation of the heritage resource to be impacted, as well as an assessment of project impacts. The purpose of the assessment is to provide recommendations as to the most appropriate manner in which the resource may be managed in light of the identified impacts. Management options may include alteration of proposed development plans to avoid resource impact, mitigative studies directed at retrieving resource values prior to impact, or compensation for the unavoidable loss of resource values.

It is especially important to utilize specialists at this stage of assessment. The evaluation of any archaeological resource should be performed by professionally qualified individuals.

Techniques utilized in evaluating the significance of a heritage site include systematic surface collecting and evaluative testing. Systematic surface collection is employed wherever archaeological remains are evident on the ground surface. However, where these sites contain buried deposits, some degree of evaluative testing is also required.

Systematic surface collection from archaeological sites should be limited, insofar as possible, to a representative sample of materials. Unless a site is exceptionally small and limited to the surface, no attempt should be made at this stage to collect all or even a major portion of the materials. Intensive surface collecting should be reserved for full scale data recovery if mitigative studies are required. Site significance is determined following an analysis of the surface collected and/or excavated materials (*Miller, C.L. II, 1989*).

There are several kinds of significance, including scientific, public, ethnic, historic and economic, that need to be taken into account when evaluating heritage resources. For any site, explicit criteria are used to measure these values. Checklists of criteria for evaluating pre-contact and post-contact archaeological sites are provided in Appendix B and Appendix C. These checklists are not intended to be exhaustive or inflexible. Innovative approaches to site evaluation which emphasize quantitative analysis and objectivity are encouraged. The process used to derive a measure of relative site significance must be rigorously documented, particularly the system for ranking or weighting various evaluatory criteria.

Site integrity, or the degree to which a heritage site has been impaired or disturbed as a result of past land alteration, is an important consideration in evaluating site significance. In this regard, it is important



to recognize that although an archaeological site has been disturbed, it may still contain important scientific information.

Heritage resources may be of scientific value in two respects. The potential to yield information which, if properly recovered, will enhance understanding of Southern African human history is one appropriate measure of scientific significance. In this respect, archaeological sites should be evaluated in terms of their potential to resolve current archaeological research problems. Scientific significance also refers to the potential for relevant contributions to other academic disciplines or to industry.

Public significance refers to the potential a site has for enhancing the public's understanding and appreciation of the past. The interpretive, educational and recreational potential of a site are valid indications of public value. Public significance criteria such as ease of access, land ownership, or scenic setting are often external to the site itself. The relevance of heritage resource data to private industry may also be interpreted as a particular kind of public significance.

Ethnic significance applies to heritage sites which have value to an ethnically distinct community or group of people. Determining the ethnic significance of an archaeological site may require consultation with persons having special knowledge of a particular site. It is essential that ethnic significance be assessed by someone properly trained in obtaining and evaluating such data.

Historic archaeological sites may relate to individuals or events that made an important, lasting contribution to the development of a particular locality or the province. Historically important sites also reflect or commemorate the historic socioeconomic character of an area. Sites having high historical value will also usually have high public value.

The economic or monetary value of a heritage site, where calculable, is also an important indication of significance. In some cases, it may be possible to project monetary benefits derived from the public's use of a heritage site as an educational or recreational facility. This may be accomplished by employing established economic evaluation methods; most of which have been developed for valuing outdoor recreation. The objective is to determine the willingness of users, including local residents and tourists, to pay for the experiences or services the site provides even though no payment is presently being made. Calculation of user benefits will normally require some study of the visitor population (*Smith, L.D. 1977*).

A heritage resource impact may be defined as the net change between the integrity of a heritage site with and without the proposed development. This change may be either beneficial or adverse.

Beneficial impacts occur wherever a proposed development actively protects, preserves or enhances a heritage resource. For example, development may have a beneficial effect by preventing or lessening natural site erosion. Similarly, an action may serve to preserve a site for future investigation by covering it with a protective layer of fill. In other cases, the public or economic significance of an archaeological site may be enhanced by actions which facilitate non-destructive public use. Although beneficial impacts are unlikely to occur frequently, they should be included in the assessment.

More commonly, the effects of a project on heritage sites are of an adverse nature. Adverse impacts occur under conditions that include:

- (a) destruction or alteration of all or part of a heritage site;
- (b) isolation of a site from its natural setting; and
- (c) introduction of physical, chemical or visual elements that are out-of-character with the heritage resource and its setting.

Adverse effects can be more specifically defined as direct or indirect impacts. Direct impacts are the immediately demonstrable effects of a project which can be attributed to particular land modifying actions. They are directly caused by a project or its ancillary facilities and occur at the same time and place. The immediate consequences of a project action, such as slope failure following reservoir inundation, are also considered direct impacts.

Indirect impacts result from activities other than actual project actions. Nevertheless, they are clearly induced by a project and would not occur without it. For example, project development may induce changes in land use or population density, such as increased urban and recreational development, which may indirectly impact upon heritage sites. Increased vandalism of heritage sites, resulting from improved

All sites or possible sites found were classified using a hierarchical system wherein sites are assessed using a scale of zero to four according to their importance. These categories are as follows;

Degree of significance	Justification	Score
Exceptional significance	Rare or outstanding, high degree of intactness. Can be interpreted easily.	13 - 16
High significance	High degree of original fabric. Demonstrates a key element of item's significance. Alterations do not detract from significance.	9 - 12
Moderate significance	Altered or modified elements. Element with little heritage value, but which contribute to the overall significance.	5 - 8
Little significance	Alterations detract from significance. One of many. Alterations detract from significance.	1 - 4
Intrusive	Damaging to the item's heritage significance.	0

Table 1. Site significance table for pre-contact sites.

Degree of significance	Justification	Score
Exceptional significance	Rare or outstanding, high degree of intactness. Can be interpreted easily.	29 - 24
High significance	High degree of original fabric. Demonstrates a key element of item's significance. Alterations do not detract from significance.	13 - 18
Moderate significance	Altered or modified elements. Element with little heritage value, but which contribute to the overall significance.	7 - 12
Little significance	Alterations detract from significance. One of many. Alterations detract from significance.	1 - 6
Intrusive	Damaging to the item's heritage significance.	0

Table 2. Site significance table for post contact sites.

The qualitative value of a site's significance will be calculated by tabling its significance characteristics (as outlined in appendix B & C) on a sliding value scale and determining an accumulative value for the specific site. Two tables will be used;

**Site significance characteristics slide scale (Pre-Contact Criteria)**

Scientific Significance	0	1	2	3	4
Public Significance	0	1	2	3	4
Ethnic Significance	0	1	2	3	4
Economic Significance	0	1	2	3	4
<b>Total Score</b>					

Table 3. Pre-contact site criteria (0- no value, 4- highest value)

<b>Site significance characteristics slide scale (Post-Contact Criteria)</b>					
Scientific Significance	0	1	2	3	4
Historic Significance	0	1	2	3	4
Public Significance	0	1	2	3	4
Other Significance	0	1	2	3	4
Ethnic Significance	0	1	2	3	4
Economic Significance	0	1	2	3	4
<b>Total Score</b>					

Table 4. Post-contact site criteria (0- no value, 4- highest value)

The values calculated (as specified in appendix B&C) are attributed to a category within the site significance table to provide the site with a quantifiable significance value. This will only be done for identified sites. Should an area under investigation not show any evidence of human activity this will be stated and no further qualifying will be done.

This information will be contained in a report that will strive to:

Review the purpose, approach, methodology and reporting of archaeological assessment and monitoring and propose guidelines on how to adequately address four key questions:

- i. What is the research value and potential of the archaeological remains?
- ii. What will the impact of development be?
- iii. What types of mitigation (by design modification or further investigation) would be appropriate to mitigate the impact of development and/or make a useful contribution to knowledge?
- iv. What will be the likely cost and timescale of any further investigation, analysis and reporting, given the nature of the archaeology and the type and extent of further work required?

## **Resource Inventory**

This section will contain the results of the heritage site inventory. Any identified sites will be indicated on the accompanying map plotted using the Arc View Geographic Information System (GIS).

### **Power line**

After intensive investigations, no sites or finds of any heritage potential were identified. The proposed area for the construction of the power line is located along existing agricultural fields. No structures were evident on the surface and none of the levelled ground showed any indications of having any historic deposits.

## **Resource Evaluation**

### **Power line**

No heritage resources, or remains of any heritage resource, were identified within the indicated study area.

## **Impact Identification and Assessment**

### **Power line**

No impacts on cultural resources are anticipated as no resources were identified in the study area.

## **Resource Management Recommendations**

### **Power line**

No recommendations can be given as no sites of any heritage potential were identified within the proposed study area. The construction of the power line can continue from a heritage point of view.

### **Power line**

No recommendations can be given as no sites of any heritage potential were identified within the proposed study area. The development of the power line can continue from a heritage point of view.

## References Cited

1. Aldenderfer, Mark S., and Carolyn A. Hale-Pierce  
1984 The Small-Scale Archaeological Survey Revisited. *American Archeology* 4(1):4-5.
2. Butler, William  
1984 Cultural Resource Management: The No-Collection Strategy in Archaeology. *American Antiquity* 44(4):795-799.
3. Deacon, J. 1996. *Archaeology for Planners, Developers and Local Authorities*. National Monuments Council. Publication no. PO21E.
4. Deacon, J. 1997. *Report: Workshop on Standards for the Assessment of Significance and Research Priorities for Contract Archaeology*. In: Newsletter No. 49, Sept. 1998. South African Association of Archaeology.
5. Dincause, Dena F., H. Martin Wobst, Robert J. Hasenstab and David M. Lacy  
1984 *A Retrospective Assessment of Archaeological Survey Contracts In Massachusetts, 1970-1979*. Massachusetts Historical Commission, Survey and Planning Grant 1980. 3 volumes.
6. Dunnell, Robert C., and William S. Dancey  
1983 The Stieless Survey: A Regional Scale Data Collection Strategy. In: *Advances in Archaeological Method and Theory* 6:267-287. M.B. Schiffer, ed.
7. Evers, T.M. 1983. *Oori or Moloko? The origins of the Sotho/Tswana on the evidence of the Iron Age of the Transvaal*. S. Afr. J. Sci. 79(7): 261-264.
8. Hall, M. 1987. *The changing past: Farmers, kings and traders in Southern Africa, 200-1860*. Cape Town: David Phillip.
9. Hall, S.L. 1981. *Iron Age sequence and settlement in the Rooiberg, Thabazimbi area*. Unpublished MA thesis, University of the Witwatersrand.
10. Huffman, T.N. 1989. *"Zimbabwe ruins and Venda prehistory."* *The Digging Stick*, 6(3), 11.
11. King, Thomas F.  
1978 *The Archaeological Survey: Its Methods and Uses*. Interagency Archaeological Services, Department of the Interior, Washington, D.C.
12. Lightfoot, Kent G.  
1989 *A Defense of Shovel Test Sampling: A Reply to Shott*. *American Antiquity* 54(2):413-416.
13. Maggs, T.M. O'C. 1976a. *Iron Age communities of the southern Highveld*. Pietermaritzburg: Natal Museum.
14. McManamon, F.P.  
1984 *Discovering Sites Unseen*. In *Advances in Archaeological Method and Theory* 8:223-292, edited by  
15. M.B. Schiffer, Academic Press, New York.

16. Miller, C. L., II 1989 Evaluating the Effectiveness of Archaeological Surveys. *Ontario Archaeology* 49:3-12.
17. Loubser, J.H.N. 1994. *Ndebele Archaeology of the Pietersburg Area*. Navors. Nas. Mus., Bloemfontein. Volume 10, Part 2: 62-147.
18. Pistorius, J.C.C. 1992. *Molokwane, an Iron Age Bakwena Village*. Johannesburg: Perskor Printers.
19. Schiffer, Michael B., Alan P. Sullivan, and Timothy C. Klinger 1978 The Design of Archaeological Surveys. *World Archaeology* 10:1-28.
20. Smith, L.D. 1977 *Archaeological Sampling Procedures For Large Land Areas: A Statistically Based Approach*. USDA Forest Service, Albuquerque.
21. Stayt, H. 1931. *The Bavenda*. London: Oxford University Press.
22. Zubrow, Ezra B.A. 1984 Small-Scale Surveys: A Problem For Quality Control. *American Archeology* 4(1):16-27.

# APPENDIX A

## PHOTOGRAPHS

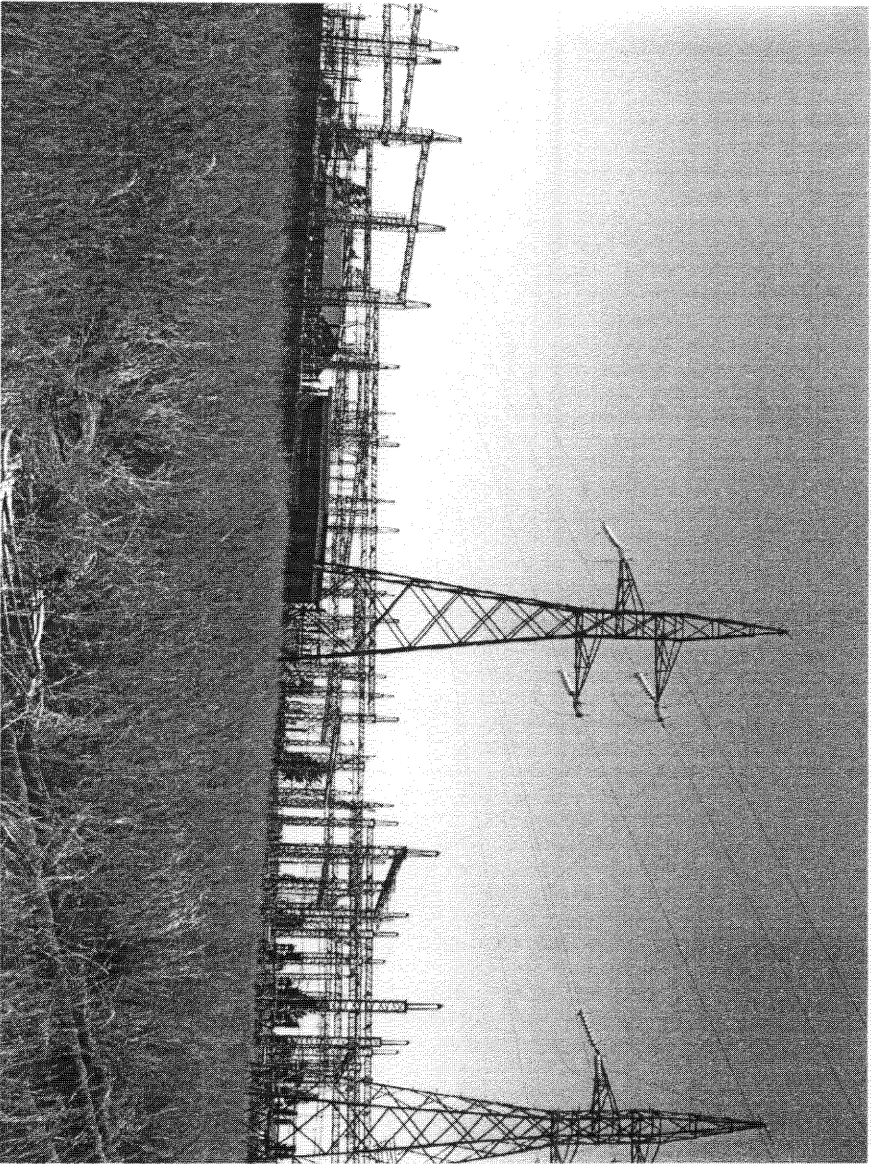


Photo 1. Sub-station at Grootpan.



Photo 2. Proposed area for placement of power line.



# APPENDIX B

## Pre-Contact Criteria

### **Scientific Significance**

- (a) Does the site contain evidence which may substantively enhance understanding of culture history, culture process, and other aspects of local and regional prehistory?
- internal stratification and depth
  - chronologically sensitive cultural items
  - materials for absolute dating
  - association with ancient landforms
  - quantity and variety of tool type
  - distinct intra-site activity areas
  - tool types indicative of specific socio-economic or religious activity
  - cultural features such as burials, dwellings, hearths, etc.
  - diagnostic faunal and floral remains
  - exotic cultural items and materials
  - uniqueness or representativeness of the site
  - integrity of the site

- (b) Does the site contain evidence which may be used for experimentation aimed at improving archaeological methods and techniques?

- monitoring impacts from artificial or natural agents
- site preservation or conservation experiments
- data recovery experiments
- sampling experiments
- intra-site spatial analysis

- (c) Does the site contain evidence which can make important contributions to paleoenvironmental studies?

- topographical, geomorphologic context
- depositional character
- diagnostic faunal, floral data

- (d) Does the site contain evidence which can contribute to other scientific disciplines such as hydrology, geomorphology, pedology, meteorology, zoology, botany, forensic medicine, and environmental hazards research, or to industry including forestry and commercial fisheries?

### **Public Significance**

- (a) Does the site have potential for public use in an interpretive, educational or recreational capacity?
- integrity of the site
  - technical and economic feasibility of restoration and development for public use
  - visibility of cultural features and their ability to be easily interpreted
  - accessibility to the public

opportunities for protection against vandalism  
representativeness and uniqueness of the site  
aesthetics of the local setting  
proximity to established recreation areas  
present and potential land use  
land ownership and administration  
legal and jurisdictional status  
local community attitude toward development

(b) Does the site receive visitation or use by tourists, local residents or school groups?

### **Ethnic Significance**

(a) Does the site presently have traditional, social or religious importance to a particular group or community?  
ethnographic or ethno-historic reference  
documented local community recognition or, and concern for, the site

### **Economic Significance**

(a) What value of user-benefits may be placed on the site?  
visitors' willingness-to-pay  
visitors' travel costs

# APPENDIX C

## Post-Contact Criteria

### **Scientific Significance**

- (a) Does the site contain evidence which may substantively enhance understanding of historic patterns of settlement and land use in a particular locality, regional or larger area?
- (b) Does the site contain evidence which can make important contributions to other scientific disciplines or industry?

### **Historic Significance**

- (a) Is the site associated with the early exploration, settlement, land use, or other aspect of southern Africa's cultural development?
- (b) Is the site associated with the life or activities of a particular historic figure, group, organization, or institution that has made a significant contribution to, or impact on, the community, province or nation?
- (c) Is the site associated with a particular historic event whether cultural, economic, military, religious, social or political that has made a significant contribution to, or impact on, the community, province or nation?
- (d) Is the site associated with a traditional recurring event in the history of the community, province, or nation, such as an annual celebration?

### **Public Significance**

- (a) Does the site have potential for public use in an interpretive, educational or recreational capacity?
  - visibility and accessibility to the public
  - ability of the site to be easily interpreted
  - opportunities for protection against vandalism
  - economic and engineering feasibility of reconstruction, restoration and maintenance
  - representativeness and uniqueness of the site
  - proximity to established recreation areas
  - compatibility with surrounding zoning regulations or land use
  - land ownership and administration
  - local community attitude toward site preservation, development or destruction
  - present use of site
- (b) Does the site receive visitation or use by tourists, local residents or school groups?

### **Ethnic Significance**

- (a) Does the site presently have traditional, social or religious importance to a particular group or community?

### **Economic Significance**

- (a) What value of user-benefits may be placed on the site?
  - visitors' willingness-to-pay
  - visitors' travel costs
  - Integrity and Condition

- (a) Does the site occupy its original location?
- (b) Has the site undergone structural alterations? If so, to what degree has the site maintained its original structure?
- (c) Does the original site retain most of its original materials?
- (d) Has the site been disturbed by either natural or artificial means?

### **Other**

- (a) Is the site a commonly acknowledged landmark?
- (b) Does, or could, the site contribute to a sense of continuity or identity either alone or in conjunction with similar sites in the vicinity?
- (c) Is the site a good typical example of an early structure or device commonly used for a specific purpose throughout an area or period of time?
- (d) Is the site representative of a particular architectural style or pattern?

# APPENDIX D

## Indicators for Assessing Impact

**Magnitude**

The amount of physical alteration or destruction which can be expected. The resultant loss of heritage value is measured either in amount or degree of disturbance.

**Severity**

The irreversibility of an impact. Adverse impacts which result in a totally irreversible and irretrievable loss of heritage value are of the highest severity.

**Duration**

The length of time an adverse impact persists. Impacts may have short-term or temporary effects, or conversely, more persistent, long-term effects on heritage sites.

**Range**

The spatial distribution, whether widespread or site-specific, of an adverse impact.

**Frequency**

The number of times an impact can be expected. For example, an adverse impact of variable magnitude and severity may occur only once. An impact such as that resulting from cultivation may be of recurring or ongoing nature.

**Diversity**

The number of different kinds of project-related actions expected to affect a heritage site.

**Cumulative Effect**

A progressive alteration or destruction of a site owing to the repetitive nature of one or more impacts.

**Rate of Change**

The rate at which an impact will effectively alter the integrity or physical condition of a heritage site. Although an important level-of-effect indicator, it is often difficult to estimate. Rate of change is normally assessed during or following project construction.



# APPENDIX E

## Location Maps

