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Archaeo-Info Northern Province

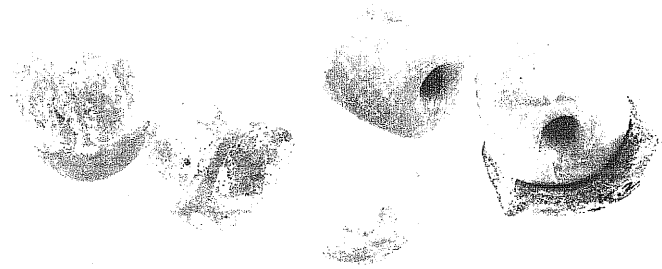
Heritage Impact Assessment

Heritage Impact Assessment for the proposed construction of a 132kv power line from Knuthala /Kendal to Agent sub station project, Wit bank area, Mpumalanga Province.

PREPARED BY:

Archaeo-Info Northern Province

PREPARED FOR NALEDZI ENVIRONMENTAL CONSULTANTS



June 2007

Credit Sheet

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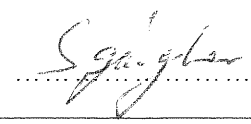
Disclaimer; *Although all possible care is taken to identify all sites of cultural importance during the investigation of study areas, it is always possible that hidden or sub-surface sites could be overlooked during the study. AINP and its personnel will not be held liable for such oversights or for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

SIGNED OF BY: Stephan Gaigher



Proposed construction of 132kv power line and new substation.

Management Summary

Site name and location: Khuthala / Kendal power line 132kv to Agent substation Witbank, Mpumalanga province.

Magisterial district: Nkangala district municipality

Developer: ESKOM SA LTD

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

Date development was mooted: April 2007.

Date of Report: 21/ 22 June 2007.

Proposed date of commencement of development: August 2007.

Findings: No site-specific actions or any further heritage mitigation measures are recommended as no heritage resource sites or finds of any value or significance were identified in the indicated study area. The proposed development of the power line and its substations in all proposed alternative routes can continue from a heritage point of view.

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Introduction

Archaeo-Info Northern Province (AINP) was contracted by Naledzi *Environmental Consultant* to conduct a Heritage Impact Assessment (HIA) on the proposed 132kv power line and substations (point of supply 1&2) project, near Witbank in the Mpumalanga Province.

This HIA forms part of the Environmental Impact Assessment (EIA) as required by the regulation in terms of chapter 5 of the National Environmental management act, 107 of 1989, and 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 21 June 07.

The extent of the proposed power line routes (alternative route 1,2and 3) was determined as well as the extent of the areas to be affected by secondary activities 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

Project start at khuthala sub station.	26°, 05′, 09″37 S 28°, 58′, 10″.09 E
Proposed power line cross at main Kendal tare road.	26°, 04′, 44″12 S 28°, 57′, 25″08 E
Proposed new substation at Kendal. (Point of supply 1)	26°, 03′37″32 S 28°, 57′40″02 E
Proposed alternative power line routes 1&2 (start from here.)	26°, 49'.26".0 S 28°, 55'.48".8 E
Proposed alternative power line route 1 intersects with alternative 2&3	26°, 49', 26".0S 28°, 50', 50".91E

Proposed construction of 132kv power line and new substation.

Proposed alternative power line route no 3	26°, 03', 53".92 S 28°, 57 03".33 E
Proposed alternative power line route no 3 intersects with alternative route 1& 2	26°, 40', 49".0 S 28°, 53', 26".45 E
Proposed existing spoor net substation at Agent (Point of supply no 2)	26°, 03', 46".09 S 28°, 48', 59".05 E

Eskom SA LTD has proposed to establish 132KV feeder bay from khuthala / Kendal power sub station, 5km chickadee power line to customer first point of supply (proposed new substation) and to Agent spoor net sub station .The proposed 132kv power line runs for 16km starting from the small substation in front of khuthala power station running north eastern side across the main Kendal tare road to the first point of supply south eastern side of Kendal silos. The proposed area is characterised of an existing wetland. Alternative one runs straight along side the railway line through cultivated field across Wilge river and vlakfontein farm on the north and continued to the sharp bend of the main Kendal/Delmas road (555).Proposed alternative two split at the same point and runs straight to the western side while alternative three runs south western side up until at schoongezigt farm the proposed power line turn to the west and follow the existing power lines and intersects with alternative two south of arbour coal mine. The proposed alternative route two and three intersects with alternative route one, after the route crosses constraint areas of the Wilge River, and further continued to small spoor net substation north of the rail way lines. The purpose of this study was to determine if the proposed route was suitable for the development of the Power line from a heritage point of view.

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 August 2007 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 a real 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 a real 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 dense vegetation should not be exempted. *(Dunnel, 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. Professionally qualified individuals should perform the evaluation of any archaeological resource.

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 someone properly trained in obtaining and evaluating such data assesses ethnic significance.

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 socio economic 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 valuating 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 pipeline 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 or newly introduced access, is also considered an indirect impact. Indirect impacts are much more difficult to assess and quantify than impacts of a direct nature.

Once all project related impacts are identified, it is necessary to determine their individual level-of-effect on heritage resources. This assessment is aimed at determining the extent or degree to which future opportunities for scientific research, preservation, or public appreciation are foreclosed or otherwise adversely affected by a proposed action. Therefore, the assessment provides a reasonable indication of the relative significance or importance of a particular impact. Normally, the assessment should follow site evaluation since it is important to know what heritage values may be adversely affected.

The assessment should include careful consideration of the following level-of-effect indicators, which are defined in Appendix D:

- Magnitude
- Severity
- Duration
- Range
- Frequency
- Diversity
- Cumulative effect
- Rate of change

The level-of-effect assessment should be conducted and reported in a quantitative and objective fashion. The methodological approach, particularly the system of ranking level-of-effect indicators, must be rigorously documented and recommendations should be made with respect to managing uncertainties in the assessment. *(Zubrow, Ezra B.A., 1984).*

The study area was surveyed using standard archaeological surveying methods. The area was surveyed using directional parameters supplied by the GPS and surveyed by foot. This technique has proven to result in the maximum coverage of an area. This action is defined as;

'An archaeologist being present in the course of the carrying-out of the development works (which may include conservation works), so as to identify and protect archaeological deposits, features or objects which may be uncovered or otherwise affected by the works' (DAHGI 1999a, 28).

Standard archaeological documentation formats were employed in the description of sites. Using standard site documentation forms as comparable medium, it enabled the surveyors to evaluate the relative importance of sites found. Furthermore GPS (Global Positioning System) readings of all finds and sites were taken. This information was then plotted using an ***eTrex Legend*** GPS (WGS 84- datum).

Indicators such as surface find, plant growth anomalies, local information and topography were used in identifying sites of possible archaeological importance. Test probes were done at intervals to determine sub-surface occurrence of archaeological material. The importance of sites was assessed by comparisons with published information as well as comparative collections.

Test excavation is that form of archaeological excavation where the purpose is to establish the nature and extent of archaeological deposits and features present in a location, which it is proposed to develop (though not normally to fully investigate those deposits or features) and allow an assessment to be made of the archaeological impact of the proposed development. It may also be referred to as archaeological testing' (DAHGI 1999a, 27).

'Test excavation should not be confused with, or referred to as, archaeological assessment which is the overall process of assessing the archaeological impact of development. Test excavation is one of the techniques in carrying out archaeological assessment which may also include, as appropriate, documentary research, field walking, examination of upstanding or visible features or structures, examination of aerial photographs, satellite or other remote sensing imagery, geophysical survey, and topographical assessment' (DAHGI 1999b, 18).

All sites or possible sites found were classified using a hierarchical system wherein sites are assessed using a scale of zero to four according 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
				Total Score	

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

Site significance characteristics slide scale (Post-Contact Criteria)

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
				Total Score	

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?

Chapter 2

Resource Inventory and Management

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 *OziExplorer* Geographic Information System (GIS).

Proposed power line alternative routes and substations.

After intensive investigations, no sites or finds of any heritage potential were identified. No structures were evident on the surface and none of the areas investigated showed any indications of having any historic deposits.

Resource Evaluation

Proposed power line alternative routes and substations.

No heritage resources, or remains of any heritage resource, were identified within the indicated study area. During the surveying period it was noticed that the proposed power line route follow through the cultivated farm land.

Impact Identification and Assessment

Proposed power line alternative routes and substations.

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

Resource Management Recommendations

Proposed power line alternative routes and substations.

No recommendations can be given as no sites of any heritage potential were identified within the proposed study area. The proposed establishment of the new 132kv power line and its substations can continue from a heritage point of view.

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APPENDIX A

PHOTOGRAPHS

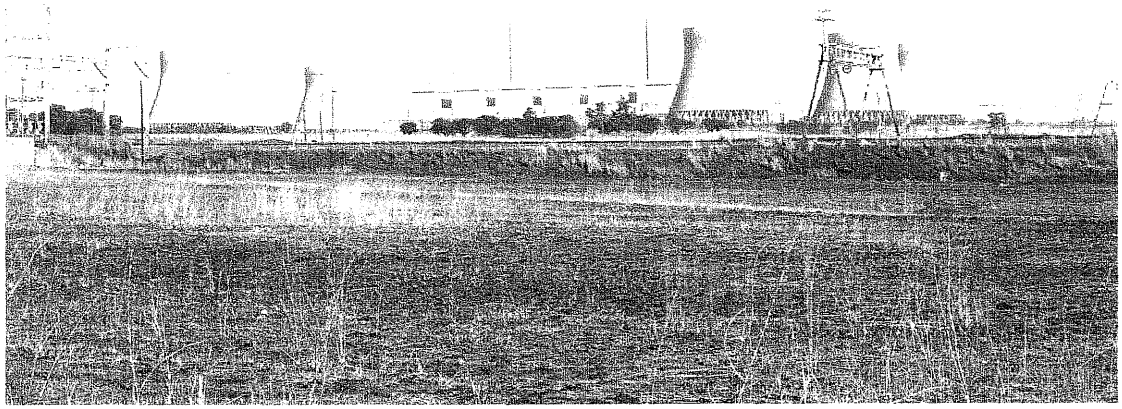

Photo 1. Project start at khuthala power station with small substation on its front.
Where the proposed 132kv power line route start from.

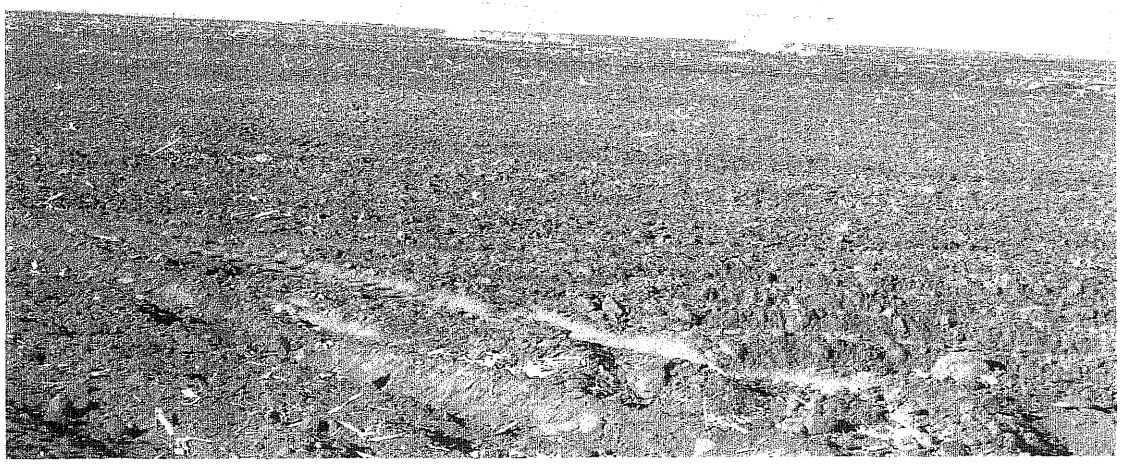

Photo 2. Proposed power line alternative route no 3 follows this existing power line.
Across this cultivated farmland

Photo 3 . Proposed area for substation development (supply point 1) the proposed area is characterised Of a wetland north of Kendal power station.

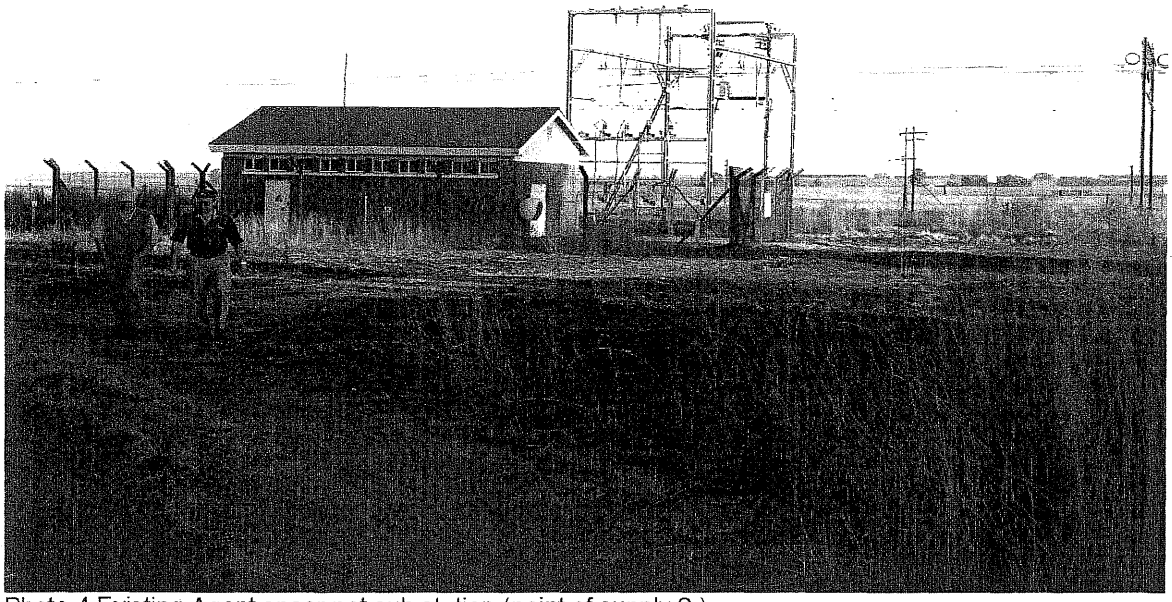

Photo 4.Existing Agent spoor net sub station (point of supply 2.)

Photo 5. Alternative route no one through cultivated field.

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 representative ness 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 pale environmental 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?

Proposed construction of 132kv power line and new substation.

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

Representative ness 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

Representative ness 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

Proposed construction of 132kv power line and new substation.

(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 and 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