Heritage Impact Assessment Report

Heritage Impact Scoping Report for the Proposed 132Kva Villiers via Frankfort to Heilbron Power Distribution Line

PREPARED BY:

PREPARED FOR:

CREDIT SHEET

Project Director

14/03/2013

STEPHAN GAIGHER (BA Hons, Archaeology, UP)

Principal Investigator for G&A Heritage

Member of ASAPA (Site Director Status)

Tel.: (015) 516 1561

Cell.: 073 752 6583

E-mail: stephan@gaheritage.co.za

Website: http://www.gaheritage.co.za

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. G&A Heritage and its personnel will not be held liable for such oversights or for costs incurred as a result of such oversights.*

Statement of Independence

As the duly appointed representative of G&A Heritage, I Stephan Gaigher, hereby confirm my independence as a specialist and declare that neither I nor G&A Heritage have any interests, be it business or otherwise, in any proposed activity, application or appeal in respect of which the Environmental Consultant was appointed as Environmental Assessment Practitioner, other than fair remuneration for work performed on this project.

EXECUTIVE SUMMARY

SIGNED OFF BY: STEPHAN GAIGHER

Site name and location: 132Kva Power distribution line from Heilbron via Frankfort to Villiers

Municipal Area: Ngwathe and Mafube Local Municipalities.

Developer: Eskom Holdings SOC Limited

Consultant: G&A Heritage, PO Box 522, Louis Trichardt, 0920, South Africa. 38A Voster Str. Louis Trichardt, 0920

Date of Report: 14 March 2013

The purpose of the management summary is to distil the information contained in the report into a format that can be used to give specific results quickly and facilitate management decisions. It is not the purpose of the management summary to repeat in shortened format all the information contained in the report, but rather to give a statement of results for decision making purposes.

This study focuses on the construction of an 132Kva power distribution line between Heilbron and Villiers via Frankfort in the Free State Province. This includes a new proposed substation. Two possible sites for the construction of these substations were identified between Frankfort and Heilbron.

This study encompasses the heritage impact investigation. A preliminary layout has been supplied to lead this phase of this study.

The purpose of this study is to determine the possible occurrence of sites with cultural heritage significance within the study area. The study is based on archival and document combined with fieldwork investigations of several alternative alignments.

Findings
Two sites on two alternative alignments with graves were identified.

Recommendations
The first site can easily be avoided through specific pylon placement. The second site is more difficult to mitigate and it is recommended that the existing road alignment be followed should this option be chosen.

Fatal Flaws
No fatal flaws were identified.

Significance

Environmental parameter	Issues	Rating prior to mitigation	Average	Rating post mitigation	Average
Heritage	Grave site 1	52		8	
	Grave site 2	52		8	
			- 52		**-8**
			Medium Negative Impact		Low Negative Impact

Comparison of summarised impacts on environmental parameters

TABLE OF CONTENTS

List of Figures

List of Abbreviations

Bp.....Before Present

EIA ..... Early Iron Age

ESA.....Early Stone Age

Fm..... Femtometre (10^{-15}m)

GPS ..... Geographic Positioning System

HIA.....Heritage Impact Assessment

LIA..... Late Iron Age

LSA .....Late Stone Age

MYA .....Million Years Ago

MSA ..... Middle Stone Age

NHRA .....National Heritage Resources Act no 22 of 1999

SAHRA .....South African Heritage Resource Agency

S&EIR.....Scoping & Environmental Impact Reporting

Um ..... Micrometre (10^{-6} m)

WGS 84..... World Geodetic System for 1984

Chapter 1

PROJECT RESOURCES

Heritage Impact Report

Heritage Impact Report for the Proposed Heilbron to Villiers Power Line

Introduction

Legislation and methodology

G&A Heritage was appointed by SiVEST to undertake a heritage scoping assessment for the proposed construction of a 132 Kva power line and substation. Section 38 (A) and 3 (2) of the South African Heritage Resources Act (25 of 1999) requires that a heritage study be undertaken for:

(a) construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
(b) construction of a bridge or similar structure exceeding 50 m in length; and
(c) any development, or other activity which will change the character of an area of land, or water –
(1) exceeding 10 000 m^2 in extent;
(2) involving three or more existing erven or subdivisions thereof; or
(3) involving three or more erven, or subdivisions thereof, which have been consolidated within the past five years; or
(d) the costs of which will exceed a sum set in terms of regulations; or
(e) any other category of development provided for in regulations.

A heritage impact assessment is not limited to archaeological artefacts, historical buildings and graves. It is far more encompassing and includes intangible and invisible resources such as places, oral traditions and rituals. A heritage resource is defined as any place or object of cultural significance i.e. of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. This includes the following:

(a) places, buildings, structures and equipment;
(b) places to which oral traditions are attached or which are associated with living heritage;
(c) historical settlements and townscapes;
(d) landscapes and natural features;
(e) geological sites of scientific or cultural importance;
(f) archaeological and paleontological sites;
(g) graves and burial grounds, including –
(1) ancestral graves,
(2) royal graves and graves of traditional leaders,
(3) graves of victims of conflict (iv) graves of important individuals,
(4) historical graves and cemeteries older than 60 years, and
(5) other human remains which are not covered under the Human Tissues Act, 1983 (Act No.65 of 1983 as amended);
(h) movable objects, including ;
(1) objects recovered from the soil or waters of South Africa including archaeological and paleontological objects and material, meteorites and rare geological specimens;
(2) ethnographic art and objects;
(3) military objects;
(4) objects of decorative art;
(5) objects of fine art;
(6) objects of scientific or technological interest;
(7) books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings; and
(8) any other prescribed categories, but excluding any object made by a living person;
(i) battlefields;
(j) traditional building techniques.

A '**place**' is defined as:
(a) A site, area or region;
(b) A building or other structure (which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure);
(c) a group of buildings or other structures (which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures); and (d) an open space, including a public square, street or park; and in relation to the management of a place, includes the immediate surroundings of a place.

'**Structures**' means any building, works, device, or other facility made by people and which is fixed to land and any fixtures, fittings and equipment associated therewith older than 60 years.

'**Archaeological**' means:
(a) material remains resulting from human activity which are in a state of disuse and are in or on land and are older than 100 years, including artefacts, human and hominid remains and artificial features and structures;
(b) rock art, being a form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and is older than 100 years including any area within 10 m of such representation; and
(c) wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land or in the maritime cultural zone referred to in section 5 of the Maritime Zones Act 1994 (Act 15 of 1994), and any cargo, debris or artefacts found or associated therewith, which are older than 60 years or which in terms of national legislation are considered to be worthy of conservation;
(d) features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found.

'Paleontological' means any fossilised remains or fossil trace of animals or plants which lived in the geological past, other than fossil fuels or fossiliferous rock intended for industrial use, and any site which contains such fossilised remains or trace.

'Grave' means a place of interment and includes the contents, headstone or other marker of and any other structures on or associated with such place. The South African Heritage Resources Agency (SAHRA) will only issue a permit for the alteration of a grave if it is satisfied that every reasonable effort has been made to contact and obtain permission from the families concerned.

The removal of graves is subject to the following procedures as outlined by the SAHRA:

- Notification of the impending removals (using English, Afrikaans and local language media and notices at the grave site);
- Consultation with individuals or communities related or known to the deceased;
- Satisfactory arrangements for the curation of human remains and / or headstones in a museum, where applicable;
- Procurement of a permit from the SAHRA;
- Appropriate arrangements for the exhumation (preferably by a suitably trained archaeologist) and re-interment (sometimes by a registered undertaker, in a formally proclaimed cemetery);
- Observation of rituals or ceremonies required by the families.

The limitations and assumptions associated with this scoping study are as follows;
- No field investigations were performed.
- Sites were evaluated by means of description of the cultural landscape and analysis of written sources and available databases.
- It was assumed that the aligment as provided by SiVEST is accurate.
- We assumed that the public participation process performed as part of the Scoping and Environmental Impact Reporting (S&EIR) process will be sufficiently encompassing not to be repeated in the Heritage Scoping Phase.

Table 1. Impacts on the NHRA Sections

Act	Section	Description	Possible Impact	Action
National Heritage Resources Act	34	Preservation of buildings older than 60 years	No impact	None

(NHRA)	35	Archaeological, paleontological and meteor sites	Possible Impact	None
	36	Graves and burial sites	Possible Impact	HIA
	37	Protection of public monuments	No impact	None
	38	Does activity trigger a HIA?	Yes	HIA

Table 2. NHRA Triggers

Action Trigger	Yes/No	Description
Construction of a road, wall, power line, pipeline, canal or other linear form of development or barrier exceeding 300m in length.	No	Power line
Construction of a bridge or similar structure exceeding 50m in length.	No	N/A
Development exceeding 5000 m^2	Yes	N/A
Development involving more than 3 erven or sub divisions	No	N/A
Development involving more than 3 erven or sub divisions that have been consolidated in the past 5 years	No	N/A
Re-zoning of site exceeding 10 000 m^2	Yes	N/A
Any other development category, public open space, squares, parks or recreational grounds	No	N/A

Background Information

Proposed 132Kva Distribution Line

Project Description

The project is for the proposed construction of a substation and a single 132kV power line. The proposed power line will be approximately 95km in length. The proposed power line will consist of four main sections of power line that will connect to three existing substations via a loop-in / loop-out connection. These three existing substations include Tweefort Substation, Frankfort Municipal Substation and Windfield Rural Substation. The power lines therefore are not separate power lines but rather connecting lines between the existing substations along the greater power line network. The registered servitude width is 31 metres (15.5 metres either side of the centre line). The four main sections of power lines include the following:

- Proposed construction of a power line from Heilbron Substation to Tweefort Substation (situated on Portion 1 of the farm Leeuw 162) (approximately 40km in length);
- Proposed construction of a power line from Tweefort Substation to Frankfort Municipal Substation (approximately 25km in length);
- Proposed construction of a power line from Frankfort Municipal Substation to Windfield Rural Substation (situated on the farm Wanner 1248) (approximately 15km); and
- Proposed construction of a power line from Windfield Rural Substation to Villiers Substation (approximately 15km).

Tower Types

The tower types that are to be used will vary in relationship between the structure, the terrain to be traversed, ground clearance requirements, geology, etc. The tower types consist of the following:

- Mono-pole guyed intermediate suspension structures;
- Mono-pole self-supporting intermediate suspension structures;
- Mono-pole angle suspension structures;
- Mono-pole strain structures;
- H-Pole structures; and
- 3 Pole strain structures.

The type of tower that would be used for this proposed 132kV power line will be determined once a routing has been negotiated and a servitude has been secured.

The foundation depths will range between 1.5-2m. Spanning lengths between tower type structures will be between 225-250m. The tower type structures will vary in length from 18-24m in height. Finally, a Chickadee conductor is to be used.

An illustration of an example of one of the proposed towers is provided in Figure 1 below.

Figure 1. Proposed towers

Proposed Substations

The substation will occupy an area of approximately 100m x 100m. The specifications of the substation will include the following:

- Install 132kV busbar (to accommodate 2 x 132kV feeder bays and 2 x transformer bays);
- Install 2 x 132kV feeder bays;
- Install 1 x 5MVA complete transformer bay;
- Make provision for additional transformer for future growth;
- Install 22kV busbar (to accommodate 2 x transformer bays and 5 x 22kV feeder bays);
- Install 4 x 22kV feeder bays;
- Make provision for additional 22kV feeder bay for future growth;
- Build a new control room;
- Add yard stones;
- Build a new access road;
- Install 2 x 14m lightning masts and equip with lights; and
- Fence off the substation servitude.

Site Location

The study area is located within the Free State Province. The proposed power lines traverse two local municipal areas. These include the Ngwathe Local Municipality and the Mafube Local Municipality. The proposed power lines fall within the greater Fezile Dabe District Municipality. The proposed power line originates from the town of Heilbron and routes eastwards to Frankfort where it then deviates to the north at Villiers. The proposed power line follows on or near to the R34 and the R26. The landscape is predominantly rural in character. Land uses for the greater part of the proposed power line encompass agricultural farming activities. Commercial and residential land uses can be found in the towns of Heilbron, Frankfort and Villiers.

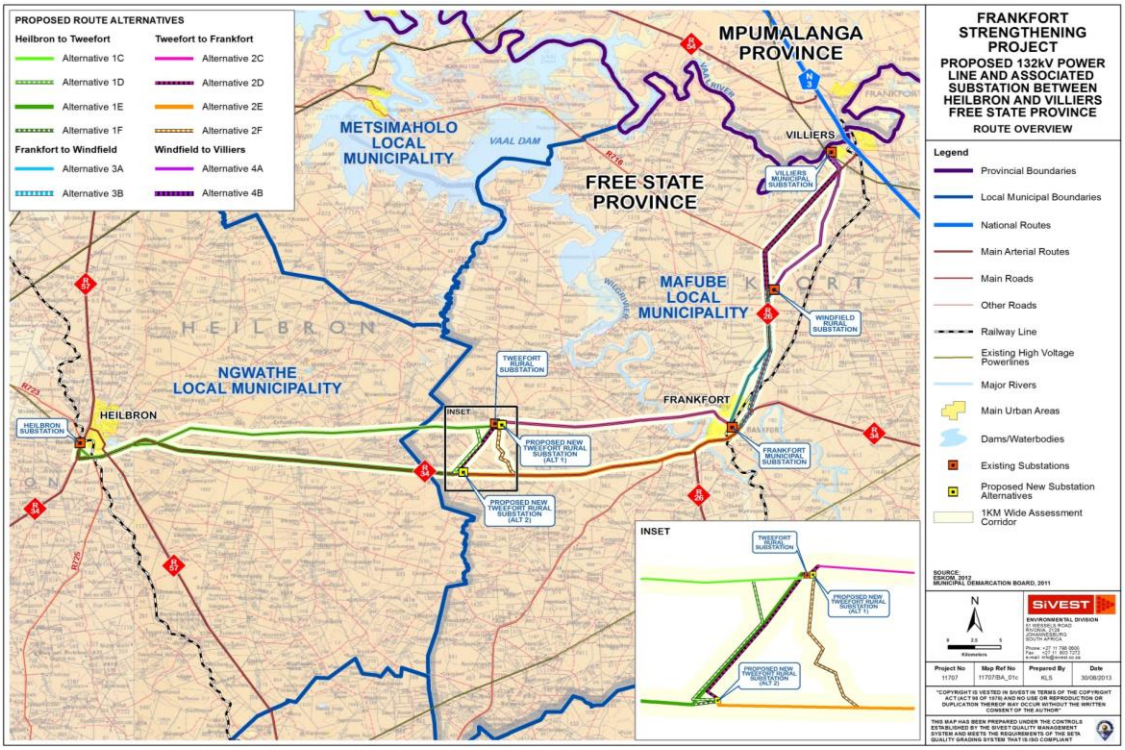

Figure 2. Location of study area

Figure 3. Proposed alternative locations for new substation

Alternatives Considered

For each section of the proposed power line, two alternative routes are proposed. Additionally, four sub-alternatives are proposed for the proposed power line alignments from the main power lines originating from Heilbron via Tweefort to Frankfort to the newly proposed substations. Twelve alternatives are therefore proposed in total. The environmental application sent to the Department of Environmental Affairs (DEA) included a corridor width of 1km (500m either side of the centre line) for each alternative. The width of the corridor will provide Eskom with sufficient space to negotiate and secure a servitude of 31m that would be required for the proposed 132kV power line. Each Alternative Route is outlined below:

- Alternative 1C – Heilbron to New Proposed Northern Tweefort Rural Substation (approximately 37km in length);
- Alternative 1D – Heilbron to New Proposed Southern Tweefort Rural Substation (approximately 43km in length);
- Alternative 1E – Heilbron to New Proposed Northern Tweefort Rural Substation (approximately 40km in length);
- Alternative 1F – Heilbron to New Proposed Southern Tweefort Rural Substation (approximately 41km in length);
- Alternative 2C – New Proposed Northern Tweefort Rural Substation to Frankfort Municipal Substation (approximately 22km in length);
- Alternative 2D – New Proposed Southern Tweefort Rural Substation to Frankfort Municipal Substation (approximately 28km in length);
- Alternative 2E – New Proposed Southern Tweefort Rural Substation to Frankfort Municipal Substation (approximately 31km in length);
- Alternative 2F – New Proposed Northern Tweefort Rural Substation to Frankfort Municipal Substation (approximately 31.5km in length);
- Alternative 3A – Frankfort Substation to Windfield Rural Substation (approximately 15km);
- Alternative 3B – Frankfort Substation to Windfield Rural Substation (approximately 15km);
- Alternative 4A – Windfield Rural Substation to Villiers Substation (approximately 15km); and
- Alternative 4B – Windfield Rural Substation to Villiers Substation (approximately 16km).

Figure 4 Power line options and sub station alternatives (red and yellow blocks)

Two sites for a proposed new substation were identified (the red and yellow squares in Fig 3). These sites are located halfway between Frankfort and Heilbron on alternative section options. The substations will also include loop-in, loop-out lines connecting with the proposed new alignments. The northern alternative site (the red square) will be designated ***Alternative A*** and the southern option ***Alternative B***.

Figure 5. Sub station alternatives A on left B on right

Methodology

This study defines the heritage component of the S&EIR process being undertaken for the Heilbron to Villiers power line. It is described as a Heritage Impact Assessment (HIA). This report attempts to evaluate the accumulated heritage knowledge of the area.

Evaluating Heritage Impacts

The study was mainly focused on systematic field surveys of the study area. Much of the route follows existing access roads, both provincial and local. Where the line does deviate from such roads it follows mainly agricultural developed areas.

Figure 6. Highly modified study area

Figure 7. Heritage sensitivity. Red - Possible archaeological sensitivity, Blue - Possible built environment sensitivity

Site investigations were performed both on foot and by vehicle where possible. Areas, which have been significantly altered, (mainly mielie fields) were not investigated in any detail on the presumption that these activities would have totally destroyed any tangible remains of heritage sites.

Where sites were identified it was documented photographically and plotted using GPS with the WGS 84 datum point as reference.

Assessing Visual Impact

Visual impacts of developments result when sites that are culturally celebrated are visually affected by a development. The exact parameters for the determination of visual impacts have not yet been rigidly defined and are still mostly open to interpretation. CNdV and DEAP (2006) have developed some guidelines for the management of the visual impacts of wind turbines in the Western Cape, although these have not yet been formalized. In these guidelines they recommend a buffer zone of 1km around significant heritage sites to minimize the visual impact.

Similar studies have determined that power lines 400kV and above are visible but not intrusive in daylight from 5km away. Power lines are however not seen as intrusive until they are 450m or closer to the observer. This aspect will vary especially in cases of cultural landscapes rather than cultural sites. In the case of cultural landscapes the sense of thoroughfare created by the power lines can be seen as detrimental to the landscape character and can significantly influence the “sense of place”.

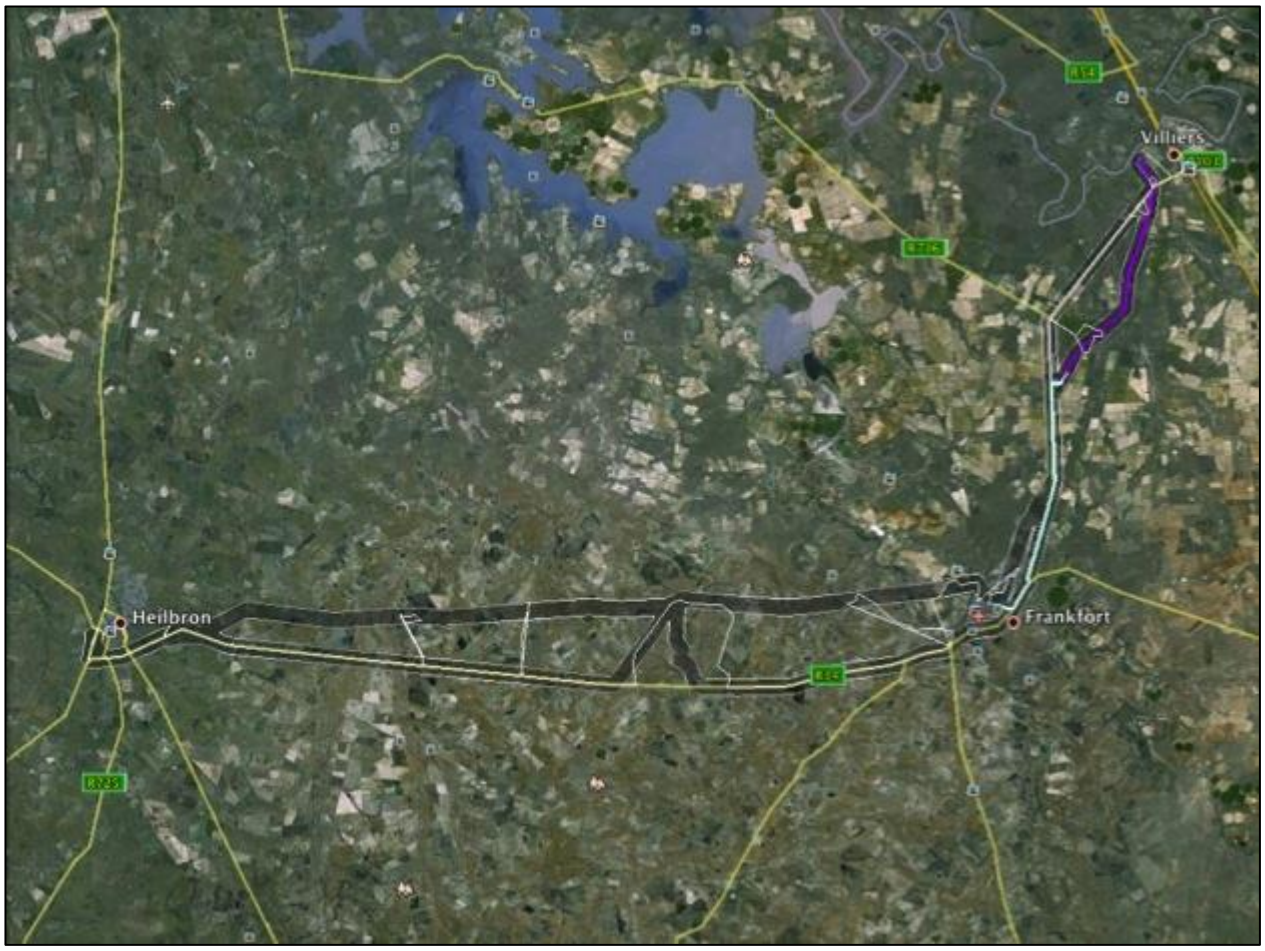

Figure 8. GPS Track Paths for Vehicle

Many of the alternatives identified follow the route of existing power lines. These options are more desirable than the undeveloped areas as the visual impact already exists and it does not result in a compounding effect.

Chapter 2

PROJECT RESOURCES

HERITAGE INDICATORS WITHIN THE RECEIVING ENVIRONMENT

REGIONAL CULTURAL CONTEXT

The number of declared sites in the Free State Province is merely an indication of sites/ buildings etc, which have received official heritage status. Most of these sites are on private land and are not open to the public. The fact that the sites or buildings are declared does not mean that they are sustainably managed, but it does place a duty on authorities to make sure that the declared buildings, which they own or are responsible for, are maintained (2003, State of the Environment Report).

PALAEONTOLOGY

Palaeontology does not form part of this study and should be evaluated by a qualified palaeontologist.

STONE AGE

Traces of human presence in the central interior of South Africa reach back to over 500 000 years ago. The Free State has a rich prehistory, which continually draws scientific interest. For instance, the internationally known fossil hominid site, Florisbad, is mentioned in all research dealing with the evolution of Homo sapiens. Other stone age inhabitants of the Free State left behind the evidence of their daily activities, as well as, later, their spiritual beliefs in the form of rock art. In the last 2000 years, Khoi herders and Iron Age farmers moved into the landscape and established themselves, leaving behind their distinctive traces. In the last 200 years European settlers moved into the area, and demarcated the boundaries of what we call the Free State today (Henderson, Z. 2003).

The archaeology of the Free State attests to human occupation of the area since the Early Stone Age (in the Free State possibly as long ago as 800 000 years). Very few of these early sites have been recorded, but an example would be the Middle Pleistocene site of Cornelia, which has produced a rich array of animal fossils, as well as a hominid molar. The other well-known hominid site, Florisbad, is also one of the two most intensively studied Middle Stone Age sites in the Free State, the other being Rose Cottage Cave near Ladybrand. Both are declared National Monuments (Government Gazettes 17457 & 19719 respectively) (2003, State of the Environment Report).

Many Later Stone Age sites in the Free State have not been intensively studied, apart from those which are now covered by the Gariep and Van der Kloof dams. These were recorded in a survey in the 1960s (Sampson, 1972). Three of the type-sites, which gave their names to Stone Age industries, are found in the Free State (viz. Fauresmith, Lockshoek and Smithfield). Rock art sites, which can be either rock engravings or rock paintings, are found throughout the Free State. Some of these sites are well maintained, and five are declared National Monuments. Not many Khoi sites are known and this area is largely under-researched.

IRON AGE

Huffman (2007) explains that in areas devoid of trees Central Cattle Pattern (CCP) communities often turned to building in stone to mark internal and external social boundaries. Because of the need for stone, settlements are often located close to, or on rocky outcrops. Typically a rubble core fills the space between outer walls. CCP homesteads are characteristically similar in that animal enclosures form a circle around a central open space, or alternatively cattle are kept in a single central kraal. Adult cattle stayed in large enclosures and calves in smaller kraals with the number of adult kraals reflecting the number of cattle owing families living in the homestead. The central open space was used for milking, slaughter and meetings. In addition he explains that the walls of these settlements act as water traps and therefore support dense vegetation, and often much denser than at the time of occupation.

In South Africa CCP communities are divided into 2 clusters namely the Moor Park Cluster and the Ntsuanatsatsi Cluster (Huffman 2007; Maggs 1976; Mitchell 2002).

1. The Moor Park Cluster: The oldest known CCP walling occurs in the Midlands of Natal and dates to the 14th-16th Centuries characterized by Moor Park walling (and beehive huts), which partially served defensive purposes. From here some Nguni groups moved up to the plateau where they built walls on top of defensive hilltops in a manner very similar to Moor Park. These Transvaal Ndebele settled throughout the Transvaal during the 17th-18th Century and their settlement clusters are often referred to as Melora type walling (associated with beehive huts). A 3rd related variant occurs in Mpumalanga and constitutes the KwaMaza stonewalled settlements of the Ndzundza Ndebele (again associated with beehive huts).
2. The Nsuanatsatsi Cluster: The oldest walling of this cluster occurs near Nsuanatsatsi Hill in the Free State province and is called Type N after the legendary place of origin of the Fokeng cluster. Type N walling consists of a few cattle kraals in the centre, linked by other walls, while a perimeter wall (sometimes incorporating small stock enclosures) surrounds the whole settlement. Little usually remains of structures in the residential areas, but stone paving may mark the location of houses, most probably of beehive type. Type N settlements typically follow a dispersed pattern: ordinary men and their extended families lived in separate homesteads while a cluster of Type N units formed a chief's capital. Type N walling dates to the 15-17th Centuries. During this period Type N spread across the Vaal into Gauteng where it is sometimes referred to as Group I / Class 1.

In the Free State Type N led to Type V; named after the Vegkop Iron Age (Barolong) settlement. Type V consists of the standard core of cattle enclosures surrounded by beehive houses and grain bins, but outer walls are usually absent. Corbelled stone huts are believed to have evolved from this settlement type. Located on the edge of the central animal area, low, corbelled stone huts were used mostly by herd boys, although in some areas of the Free State they may have been used as houses for adults. Type V sites date to the 17th-early 19th Centuries and was built by people of the Fokeng cluster.

The Caledon River Valley is an area in the Free State with documented evidence of settlement by the Fokeng group of Iron Age communities. Originally settled between Frankfort and Vrede this group later moved to the Metlaeeng area (Walton, 1953).

The Historic Era

As highlighted above the area is dominated by agricultural activities. The three towns associated with the project – Villiers, Frankfort and Heilbron all contain significant historic structures as well as classic examples of the Freestate Sandstone vernacular architecture. Due to restrictions regarding the construction of power lines over inhabited areas, damage to such structures are not anticipated. Apart from their agricultural history, none of these towns are associated in any significant way with other historic highlights of the area such as the South African War or the various gold- and diamond rushes. An area just outside of Villiers showed a pitted landscape that resembles some skirmish sites in northern KwaZulu Natal, however no reference to any battle sites could be found to substantiate this theory and this is most probably a natural geographic feature. The British burnt down the church in Frankfort during the war. In Heilbron a British Concentration Camp graveyard is found, although it is well outside of the proposed corridor.

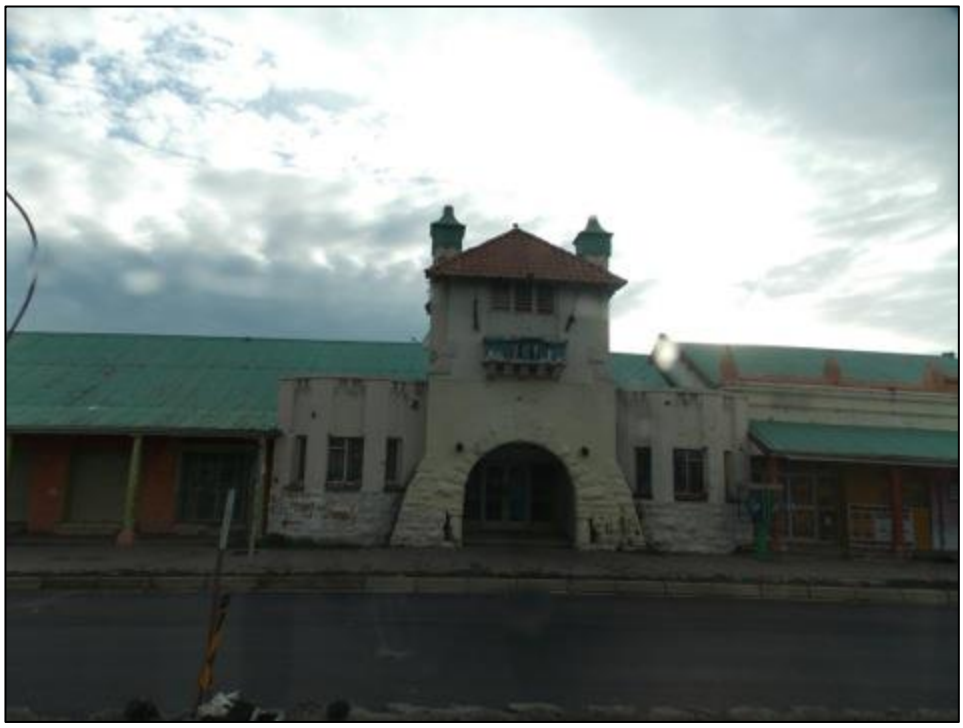

Figure 9. Historic building in Heilbron

Figure 10. Historic Church

20km to the south of Heilbron a relatively important skirmish unfolded between the Hendrik Potgieter Voortrekkers and the Matabele of Mzilikazi. On 9th October Mzilikazi, the Matabele king, sent out a force of nearly 6 000 men from his kraal at Mosega, south-west of where Zeerust is situated today. They were under the command of a certain Kalipi whose orders were to 'eat up' the Voortrekkers. The date of the attack on the laager is uncertain, but it was about the 19th October. Potgieter with a small commando rode out for an hour and a half to meet the Matabele and tried unsuccessfully to persuade them by peaceful means to turn back. They had to fall back on the laager, shooting as they went, and eventually

retired into it. Thereupon the Matabele launched a fierce attack on the laager, but the heroic defence stood firm. Eventually the Matabele had to break off the action, having lost 430 men. The Voortrekker losses were two killed and fourteen wounded. Eleven hundred and thirty-seven assegaais were collected in the laager. Many of the riding horses in the laager were wounded and numbers of wagons were damaged but the most serious calamity was that the Matabele had syolen all the cattle and sheep (SAHRIS archive). Besides its historical importance, Vegkop is also of archaeological interest. The top of the hill was once the site of a large Leghoya settlement and the scattered remains of their corbelled stone huts can still be seen there. The area is an open terrace with an entrance gate and inside is a monument situated on rocks.

Large areas, especially around the urban areas, are presently subject to sprawling low-income housing projects, both formal and informal. These large communities results in associated burial grounds as well as religious sites that should be taken into consideration.

Previous Studies

An extensive research into the SAHRIS database resulted in the identification of the following heritage related studies that have been performed over the last decade in the study area. Only studies within a radius of 50km from the study area were considered.

- Archaeological Impact Assessment PORTIONS OF ZOETVLEI, RAAFFIE, MOOIHOEK AND ERFHOEK, DISTRICT HEILBRON, FREE-STATE PROVINCE. Heritage Contracts Unit
- FIRST PHASE ARCHAEOLOGICAL AND HISTORICAL INVESTIGATION OF THE PROPOSED ERECTION OF A CELL PHONE MAST AT THE FARM WAAGSTUK 136, HEILBRON, FREE STATE. Cobus Dreyer, 2007.
- Heritage Impact Assessment of the Proposed Expansion of the Current New Vaal Colliery Mining Operations Maccauvlei West Heilbron District Free State Province Final Report. Johan Bruwer, 2006.
- Heritage Assessment for the Proposed Lizard Point Golf Estate to Be Developed on the Farm Vaaldam Settlement 1777, Heilbron District Free State. Van Schalkwyk, 2005.
- Heritage Impact Assessment: Establishment of an Interdenominational Christian Cemetery at the 'Vegkop' Provincial Heritage Site, Heilbron District, Free State, South Africa. Van Ryneveld, 2009.
- A cultural heritage impact assessment on portions of the farm Vaaldam Settlement 1777, Pelser 2007.
- A Report on a Heritage Impact Assessment Study for a Proposed New Residential Development on Portions 1, 2 & 3 Roodepoortje 178 and Portion 1 Riviera 1781, Heilbron District Free State Province. Pelser 2008.
- A Report on a Cultural Heritage Impact Assessment for the Proposed Township Development on the Farm Joffre 1172, District Heilbron, Free State Province. Pelser 2008.
- Archaeological and Cultural Heritage Assessment of the Proposed Residential Developments at Namahadi (Frankfort), Free State. Dreyer 2008.
- A Report on a Cultural Heritage Impact Assessment on Various Portions of the Farms Vaaldam Settlement 1777 and Uitkyk 506, Frankfort & Heilbron Districts, Free State Province. Pelser 2007.
- Zeus-Perseus 765 KV transmission Line: EIA : Heritage Impact Assessment. PBA International, 2012.
- A REPORT ON A CULTURAL HERITAGE IMPACT ASSESSMENT FOR THE PROPOSED REFENKGOTSO EXTENSION TOWNSHIP DEVELOPMENT ON THE REMAINDER OF THE FARM KNOPPIESFONTEIN NO 94, FREE STATE PROVINCE, Pelser, 2009.
- Heritage Resources, State of the Environment Report for the Free State. Henderson, 2003.

The findings of these studies were varied, however there seemed to be a constant pattern of scattered graves and cemeteries found throughout. Iron age remains were mostly loose unassociated corbelled huts and herder posts. Only one instance of engraved rocks is recorded for the Stone Age. Many of the reports support the author's opinion that the heavily modified agricultural fields would hols no remains of any significance.

Chapter 3

ANTICIPATED IMPACTS

MEASURING AND EVALUATING THE CULTURAL SENSITIVITY OF THE STUDY AREA

In 2003 the SAHRA compiled the following guidelines to evaluate the cultural significance of individual heritage resources:

TYPE OF RESOURCE

- Place
- Archaeological Site
- Structure
- Grave
- Paleontological Feature
- Geological Feature

TYPE OF SIGNIFICANCE

1. HISTORIC VALUE
   It is important in the community, or pattern of history
   - Important in the evolution of cultural landscapes and settlement patterns
   - Important in exhibiting density, richness or diversity of cultural features illustrating the human occupation and evolution of the nation, province, region or locality.
   - Important for association with events, developments or cultural phases that have had a significant role in the human occupation and evolution of the nation, province, region or community.
   - Important as an example for technical, creative, design or artistic excellence, innovation or achievement in a particular period.

   It has strong or special association with the life or work of a person, group or organisation of importance in history
   - Importance for close associations with individuals, groups or organisations whose life, works or activities have been significant within the history of the nation, province, region or community.

   It has significance relating to the history of slavery
   - Importance for a direct link to the history of slavery in South Africa.

2. AESTHETIC VALUE
   It is important in exhibiting particular aesthetic characteristics valued by a community or cultural group.
   - Important to a community for aesthetic characteristics held in high esteem or otherwise valued by the community.
   - Importance for its creative, design or artistic excellence, innovation or achievement.
   - Importance for its contribution to the aesthetic values of the setting demonstrated by a landmark quality or having impact on important vistas or otherwise contributing to the identified aesthetic qualities of the cultural environs or the natural landscape within which it is located.
   - In the case of an historic precinct, importance for the aesthetic character created by the individual components which collectively form a significant streetscape, townscape or cultural environment.

3. SCIENTIFIC VALUE
   It has potential to yield information that will contribute to an understanding of natural or cultural heritage

- Importance for information contributing to a wider understanding of natural or cultural history by virtue of its use as a research site, teaching site, type locality, reference or benchmark site.
- Importance for information contributing to a wider understanding of the origin of the universe or of the development of the earth.
- Importance for information contributing to a wider understanding of the origin of life; the development of plant or animal species, or the biological or cultural development of hominid or human species.
- Importance for its potential to yield information contributing to a wider understanding of the history of human occupation of the nation, Province, region or locality.
- It is important in demonstrating a high degree of creative or technical achievement at a particular period
- Importance for its technical innovation or achievement.

4. SOCIAL VALUE
   - It has strong or special association with a particular community or cultural group for social, cultural or spiritual reasons
   - Importance as a place highly valued by a community or cultural group for reasons of social, cultural, religious, spiritual, symbolic, aesthetic or educational associations.
   - Importance in contributing to a community's sense of place.

DEGREES OF SIGNIFICANCE

1. RARITY

It possesses uncommon, rare or endangered aspects of natural or cultural heritage.

- Importance for rare, endangered or uncommon structures, landscapes or phenomena.

2. REPRESENTIVITY
   - It is important in demonstrating the principal characteristics of a particular class of natural or cultural places or objects.
   - Importance in demonstrating the principal characteristics of a range of landscapes or environments, the attributes of which identify it as being characteristic of its class.
   - Importance in demonstrating the principal characteristics of human activities (including way of life, philosophy, custom, process, land-use, function, design or technique) in the environment of the nation, province, region or locality.

The table below illustrates how a site's heritage significance is determined

Spheres of Significance	High	Medium	Low
International			
National			
Provincial			
Regional			
Local			
Specific Community			

Assessment of Heritage Potential

Assessment Matrix

Determining Heritage Sensitivity

In addition to guidelines provided by the National Heritage Resources Act (Act No. 25 of 1999), a set of criteria based on Deacon (J) and Whitelaw (1997) for assessing archaeological significance has been developed for Northern Cape settings (Morris 2007a). These criteria include estimation of landform potential (in terms of its capacity to contain archaeological traces) and assessing the value to any archaeological traces (in terms of their attributes or their capacity to be construed as evidence, given that evidence is not given but constructed by the investigator).

Estimating site potential

Table 1 (below) is a classification of landforms and visible archaeological traces used for estimating the potential of archaeological sites (after J. Deacon and, National Monuments Council). Type 3 sites tend to

be those with higher archaeological potential, but there are notable exceptions to this rule, for example the renowned rock engravings site Driekopseiland near Kimberley which is on landform L1 Type 1 – normally a setting of lowest expected potential. It should also be noted that, generally, the older a site the poorer the preservation, so that sometimes any trace, even of only Type 1 quality, could be of exceptional significance. In light of this, estimation of potential will always be a matter for archaeological observation and interpretation.

Table 1. Classification of landforms and visible archaeological traces for estimating the potential for archaeological sites (after J. Deacon, NMC as used in Morris)

Class	Landform	Type 1	Type 2	Type 3
L1	Rocky Surface	Bedrock exposed	Some soil patches	Sandy/grassy patches
L2	Ploughed land	Far from water	In floodplain	On old river terrace
L3	Sandy ground, inland	Far from water	In floodplain or near features such as hill/dune	On old river terrace
L4	Sandy ground, coastal	>1 km from sea	Inland of dune cordon	Near rocky shore
L5	Water-logged deposit	Heavily vegetated	Running water	Sedimentary basin
L6	Developed urban	Heavily built-up with no known record of early settlement	Known early settlement, but buildings have basements	Buildings without extensive basements over known historical sites
L7	Lime/dolomite	>5 myrs	<5000 yrs	Between 5000 yrs and 5 myrs
L8	Rock shelter	Rocky floor	Loping floor or small area	Flat floor, high ceiling
Class	Archaeological traces	Type 1	Type 2	Type 3
A1	Area previously excavated	Little deposit remaining	More than half deposit remaining	High profile site
A2	Shell of bones visible	Dispersed scatter	Deposit <0.5 m thick	Deposit >0.5 m thick; shell and bone dense
A3	Stone artefacts or stone walling or other feature visible	Dispersed scatter	Deposit <0.5m thick	Deposit >0.5 m thick

Table 2. Site attributes and value assessment (adapted from Whitelaw 1997 as used in Morris)

Class	Landforms	Type 1	Type 2	Type 3
1	Length of sequence /context	No sequence Poor context Dispersed distribution	Limited sequence	Long sequence Favourable context High density of arte / ecofacts
2	Presence of exceptional items (incl. regional rarity)	Absent	Present	Major element
3	Organic preservation	Absent	Present	Major element
4	Potential for future archaeological investigation	Low	Medium	High
5	Potential for public display	Low	Medium	High
6	Aesthetic appeal	Low	Medium	High
7	Potential for implementation of a long-term management plan	Low	Medium	High

Assessing site value by attribute

Table 2 is adapted from Whitelaw (1997), who developed an approach for selecting sites meriting

heritage recognition status in KwaZulu-Natal. It is a means of judging a site's archaeological value by ranking the relative strengths of a range of attributes (given in the second column of the table). While aspects of this matrix remain qualitative, attribute assessment is a good indicator of the general archaeological significance of a site, with Type 3 attributes being those of highest significance.

Findings

In this section the results of the survey will be given. The sites will be described and evaluated and their locations given.

Site 1

GPS 27,184602° E
28,542309° S

This is a small informal graveyard with at least four graves. It is camped off with barbwire fencing. This site falls within the survey corridor. It should be easy to avoid this site by specific pylon placement.

Figure 11. Graves at site 1

Figure 12. Location of Site 1

Site 2

GPS 27,267023° E
28,510929° S

This is a much larger graveyard located near Frankfort in the Namahadi Township. The graveyard consists of several thousand graves and is currently actively in use. It is recommended that the proposed power line follow an alignment along the existing access road servitude. This will ensure that it does not cross over the graveyard resulting in the need to place supporting pylons inside of the graveyard complex. This could result in damage to graves and will cause unnecessary negative feelings towards the development. The site is apparently of recent nature despite its large size. Dreyer mentions the same area in a report in 2008 without any reference to this graveyard suggesting that it was put to use later than 2008 (Dreyer, 2008).

Figure 13. Extended graveyard

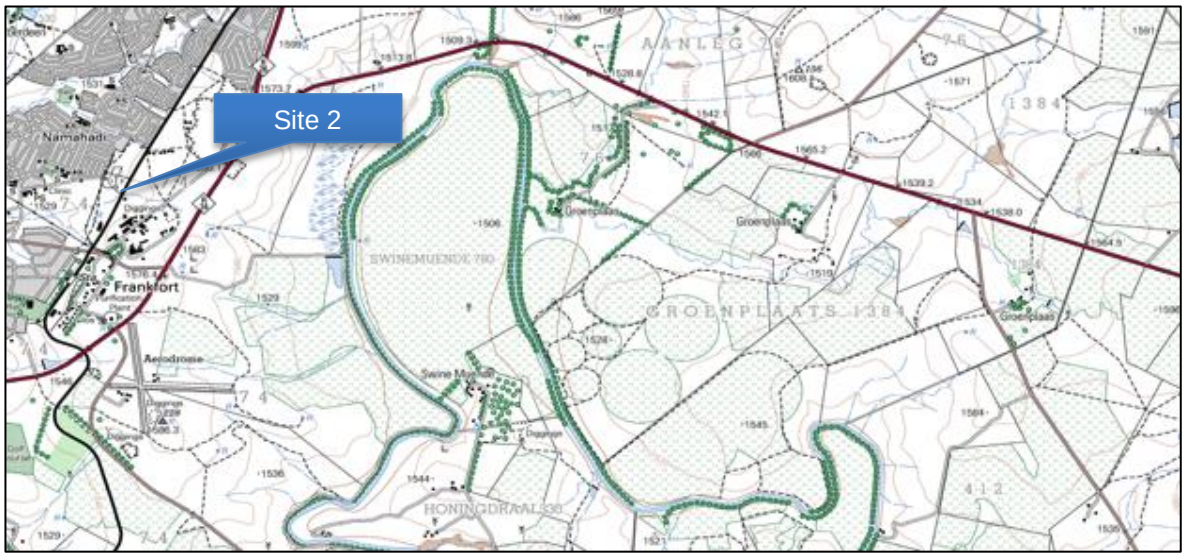

Figure 14. Location of Site 2

Figure 15. Extent of graveyard (green tint indicates power line corridor)

IMPACT STATEMENT

PALEONTOLOGICAL SITES

Should bedrock be affected a specialized paleontological study will be required.

Mitigation

Paleontological Impact Assessment.

Pre-Contact Sites

It is not anticipated that any sites of the pre-contact phase will be encountered.

Post-Contact Sites

Two burial sites are located within the study corridors. It is possible that further sites might be found in the corridors that have not been identified by the initial study.

Mitigation

A walk-down of the final alignment and pylon placement is recommended.

Built Environment

Study of aerial photographs of the area did not indicate the presence of any significant built structures. The only formal structures noticed are concrete reservoirs. The occurrence of more obscure remains such as building foundations is still possible.

Mitigation

Walk-down of the final alignment choice.

Cultural Landscape

The following landscape types could possibly be present in the study area.

Landscape Type	Description	Occurrence still possible?	Likely occurrence?
1 Paleontological	Mostly fossil remains. Remains include microbial fossils such as found in Baberton Greenstones	Yes, sub-surface	Unlikely
2 Archaeological	Evidence of human occupation associated with the following phases – Early-, Middle-, Late Stone Age, Early-, Late Iron Age, Pre-Contact Sites, Post-Contact Sites	Yes	Unlikely
3 Historic Built Environment	- Historical townscapes/streetscapes - Historical structures; i.e. older than 60 years - Formal public spaces - Formally declared urban conservation areas - Places associated with social identity/displacement	No	No
4 Historic Farmland	These possess distinctive patterns of settlement and historical features such as: - Historical farm yards - Historical farm workers villages/settlements - Irrigation furrows - Tree alignments and groupings - Historical routes and pathways - Distinctive types of planting - Distinctive architecture of cultivation e.g. planting blocks, trellising, terracing, ornamental planting.	Yes	Unlikely
5 Historic rural town	- Historic mission settlements - Historic townscapes	No	No
6 Pristine natural	- Historical patterns of access to a natural	Yes	Unlikely

landscape	amenity - Formally proclaimed nature reserves - Evidence of pre-colonial occupation - Scenic resources, e.g. view corridors, viewing sites, visual edges, visual linkages - Historical structures/settlements older than 60 years - Pre-colonial or historical burial sites - Geological sites of cultural significance.		
7 Relic Landscape	- Past farming settlements - Past industrial sites - Places of isolation related to attitudes to medical treatment - Battle sites - Sites of displacement,	Yes, Siege of Mafikeng	Unlikely
8 Burial grounds and grave sites	- Pre-colonial burials (marked or unmarked, known or unknown) - Historical graves (marked or unmarked, known or unknown) - Graves of victims of conflict - Human remains (older than 100 years) - Associated burial goods (older than 100 years) - Burial architecture (older than 60 years)	Yes,	Yes
9 Associated Landscapes	- Sites associated with living heritage e.g. initiation sites, harvesting of natural resources for traditional medicinal purposes - Sites associated with displacement & contestation - Sites of political conflict/struggle - Sites associated with an historic event/person - Sites associated with public memory	No	No
10 Historical Farmyard	- Setting of the yard and its context - Composition of structures - Historical/architectural value of individual structures - Tree alignments - Views to and from - Axial relationships - System of enclosure, e.g. defining walls - Systems of water reticulation and irrigation, e.g. furrows - Sites associated with slavery and farm labour - Colonial period archaeology	No	No
11 Historic institutions	- Historical prisons - Hospital sites - Historical school/reformatory sites - Military bases	No	No
12 Scenic visual	- Scenic routes	No	No
13 Amenity landscape	- View sheds - View points - Views to and from - Gateway conditions - Distinctive representative landscape conditions - Scenic corridors	No	No

IMPACT EVALUATION

The EIA Methodology assists in evaluating the overall effect of a proposed activity on the environment. The determination of the effect of an environmental impact on an environmental parameter is determined through a systematic analysis of the various components of the impact. This is undertaken using information that is available to the environmental practitioner through the process of the environmental impact assessment. The impact evaluation of predicted impacts was undertaken through an assessment of the significance of the impacts.

Determination of Significance of Impacts

Significance is determined through a synthesis of impact characteristics, which include context, and intensity of an impact. Context refers to the geographical scale i.e. site, local, national or global whereas Intensity is defined by the severity of the impact e.g. the magnitude of deviation from background conditions, the size of the area affected, the duration of the impact and the overall probability of occurrence. Significance is calculated as shown in the table below.

Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. The total number of points scored for each impact indicates the level of significance of the impact.

Impact Rating System

Impact assessment must take account of the nature, scale and duration of effects on the environment whether such effects are positive (beneficial) or negative (detrimental). Each issue / impact is also assessed according to the project stages:

- planning
- construction
- operation
- decommissioning

Where necessary, the proposal for mitigation or optimisation of an impact should be detailed. A brief discussion of the impact and the rationale behind the assessment of its significance has also been included.

Rating System Used To Classify Impacts

The rating system is applied to the potential impact on the receiving environment and includes an objective evaluation of the mitigation of the impact. Impacts have been consolidated into one rating. In assessing the significance of each issue the following criteria (including an allocated point system) is used:

NATURE
Include a brief description of the impact of environmental parameter being assessed in the context of the project. This criterion includes a brief written statement of the environmental aspect being impacted upon by a particular action or activity.
GEOGRAPHICAL EXTENT

This is defined as the area over which the impact will be expressed. Typically, the severity and significance of an impact have different scales and as such bracketing ranges are often required. This is often useful during the detailed assessment of a project in terms of further defining the determined.		
1	Site	The impact will only affect the site
2	Local/district	Will affect the local area or district
3	Province/region	Will affect the entire province or region
4	International and National	Will affect the entire country
PROBABILITY		
This describes the chance of occurrence of an impact		
1	Unlikely	The chance of the impact occurring is extremely low (Less than a 25% chance of occurrence).
2	Possible	The impact may occur (Between a 25% to 50% chance of occurrence).
3	Probable	The impact will likely occur (Between a 50% to 75% chance of occurrence).
4	Definite	Impact will certainly occur (Greater than a 75% chance of occurrence).
REVERSIBILITY		
This describes the degree to which an impact on an environmental parameter can be successfully reversed upon completion of the proposed activity.		
1	Completely reversible	The impact is reversible with implementation of minor mitigation measures
2	Partly reversible	The impact is partly reversible but more intense mitigation measures are required.
3	Barely reversible	The impact is unlikely to be reversed even with intense mitigation measures.
4	Irreversible	The impact is irreversible and no mitigation measures exist.
IRREPLACEABLE LOSS OF RESOURCES		
This describes the degree to which resources will be irreplaceably lost as a result of a proposed activity.		
1	No loss of resource.	The impact will not result in the loss of any resources.
2	Marginal loss of resource	The impact will result in marginal loss of resources.
3	Significant loss of resources	The impact will result in significant loss of resources.
4	Complete loss of resources	The impact is result in a complete loss of all resources.
DURATION		
This describes the duration of the impacts on the environmental parameter. Duration indicates the lifetime of the impact as a result of the proposed activity		
1	Short term	The impact and its effects will either disappear with mitigation or will be mitigated through natural process in a span shorter than the construction phase (0 – 1 years), or the impact and its effects will last for the period of a relatively short construction period and a limited recovery time after construction, thereafter it will be

		entirely negated (0 – 2 years).
2	Medium term	The impact and its effects will continue or last for some time after the construction phase but will be mitigated by direct human action or by natural processes thereafter (2 – 10 years).
3	Long term	The impact and its effects will continue or last for the entire operational life of the development, but will be mitigated by direct human action or by natural processes thereafter (10 – 50 years).
4	Permanent	The only class of impact that will be non-transitory. Mitigation either by man or natural process will not occur in such a way or such a time span that the impact can be considered transient (Indefinite).
CUMULATIVE EFFECT		
This describes the cumulative effect of the impacts on the environmental parameter. A cumulative effect/impact is an effect which in itself may not be significant but may become significant if added to other existing or potential impacts emanating from other similar or diverse activities as a result of the project activity in question.		
1	Negligible Cumulative Impact	The impact would result in negligible to no cumulative effects
2	Low Cumulative Impact	The impact would result in insignificant cumulative effects
3	Medium Cumulative impact	The impact would result in minor cumulative effects
4	High Cumulative Impact	The impact would result in significant cumulative effects
INTENSITY / MAGNITUDE		
Describes the severity of an impact		
1	Low	Impact affects the quality, use and integrity of the system/component in a way that is barely perceptible.
2	Medium	Impact alters the quality, use and integrity of the system/component but system/ component still continues to function in a moderately modified way and maintains general integrity (some impact on integrity).
3	High	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component is severely impaired and may temporarily cease. High costs of rehabilitation and remediation.
4	Very high	Impact affects the continued viability of the system/component and the quality, use, integrity and functionality of the system or component permanently ceases and is irreversibly impaired (system collapse). Rehabilitation and remediation often impossible. If possible rehabilitation and remediation often unfeasible due to extremely high costs of rehabilitation and remediation.

SIGNIFICANCE
Significance is determined through a synthesis of impact characteristics. Significance is an indication of the importance of the impact in terms of both physical extent and time scale, and therefore indicates the level of mitigation required. This describes the significance of the impact on the environmental parameter. The calculation of the significance of an impact uses the following formula: **(Extent + probability + reversibility + irreplaceability + duration + cumulative effect) x magnitude/intensity.** The summation of the different criteria will produce a non weighted value. By multiplying this value with the magnitude/intensity, the resultant value acquires a weighted characteristic which can be measured and assigned a significance rating.

Points	Impact Significance Rating	Description
6 to 28	Negative Low impact	The anticipated impact will have negligible negative effects and will require little to no mitigation.
6 to 28	Positive Low impact	The anticipated impact will have minor positive effects.
29 to 50	Negative Medium impact	The anticipated impact will have moderate negative effects and will require moderate mitigation measures.
29 to 50	Positive Medium impact	The anticipated impact will have moderate positive effects.
51 to 73	Negative High impact	The anticipated impact will have significant effects and will require significant mitigation measures to achieve an acceptable level of impact.
51 to 73	Positive High impact	The anticipated impact will have significant positive effects.
74 to 96	Negative Very high impact	The anticipated impact will have highly significant effects and are unlikely to be able to be mitigated adequately. These impacts could be considered "fatal flaws".
74 to 96	Positive Very high impact	The anticipated impact will have highly significant positive effects.

IMPACT ASSESSMENT

SITE 001

IMPACT TABLE FORMAT	
Environmental Parameter	*Heritage Site. Burial ground.*
Issue/Impact/Environmental Effect/Nature	*Damage to graves*
Extent	*Limited to the grave sites*
Probability	*Avoiding the site should be easy through specific placement of power line pylons*
Reversibility	*Damage to the site will be permanent and not reversibil*

Irreplaceable loss of resources	*On a socio-cultural scale graves are unique and irreplaceable*	
Duration	*Impact will be limited to the construction phase of the project*	
Cumulative effect	*The impact will be singular and no cumulative effect is anticipated*	
Intensity/magnitude	*Local negativity towards the project will be expressed by local inhabitants should these sites be damaged*	
Significance Rating	*The site has local socio-cultural significance*	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	4	2
Reversibility	4	1
Irreplaceable loss	2	2
Duration	1	1
Cumulative effect	1	1
Intensity/magnitude	4	1
Significance rating	52 (medium negative)	8 (low negative)
Mitigation measures	*The burial site should be indicated on the EIA sensitivity map. The site should be avoided by at least 50m. If this is not possible the burial site should be exhumed and re-interned by a specialist grave relocation company.*	

Rating of impacts

Site 002

IMPACT TABLE FORMAT	
Environmental Parameter	*Heritage Site. Burial ground.*
Issue/Impact/Environmental Effect/Nature	*Damage to graves*
Extent	*Limited to the grave sites*
Probability	*Avoiding the site should be easy through specific placement of power line pylons*
Reversibility	*Damage to the site will be permanent and not reversibil*
Irreplaceable loss of resources	*On a socio-cultural scale graves are unique and irreplaceable*
Duration	*Impact will be limited to the construction phase of the project*
Cumulative effect	*The impact will be singular and no cumulative effect is anticipated*
Intensity/magnitude	*Local negativity towards the project will be expressed by local inhabitants should these sites be damaged*

Significance Rating	*The site has local socio-cultural significance*	
	Pre-mitigation impact rating	Post mitigation impact rating
Extent	1	1
Probability	4	2
Reversibility	4	1
Irreplaceable loss	2	2
Duration	1	1
Cumulative effect	1	1
Intensity/magnitude	4	1
Significance rating	52 (medium negative)	8 (low negative)
Mitigation measures	*The burial site should be indicated on the EIA sensitivity map. The site should be avoided by at least 50m. If this is not possible the burial site should be exhumed and re-interned by a specialist grave relocation company.*	

CHOICE OF ALIGNMENT & SUB STATION

Several alignment choices are given for this project. The table below is a condensation of the choices available and how they rate against each other in regards to their heritage sensitivity.

Preferred	The alternative will result in a low impact / reduce the impact
Not Preferred	The alternative will result in a high impact / increase the impact
Favourable	The impact will be relatively insignificant
No Preference	Both alternatives will result in similar impacts

CHOICE OF ALIGNMENT

Alternative	Preference	Reasons
HEILBRON TO TWEEFORT RURAL SUBSTATION POWER LINE SECTION		
Alternative 1C	Not Preferred	Sub-surface sites could still be intact
Alternative 1D	No Preference	No sites identified
Alternative 1E	Favourable	R34 road works possibly already disturbed any sub-surface sites
Alternative 1F	No Preference	No sites identified
TWEEFORT RURAL SUBSTATION TO FRANKFORT POWER LINE SECTION		
Alternative 2C	Not Preferred	Unidentified sites could still occur in this unmodified environment
Alternative 2D	No Preference	No sites were identified
Alternative 2E	Favourable	Modification of the environment due to the R34 construction
Alternative 2F	No Preference	No sites were identified
FRANKFORT TO WINDFIELD RURAL SUBSTATION POWER LINE SECTION		

Alternative	Preference	Reasons
Alternative 3A	Not Preferred	Large burial sites at Site 2 will make pylon placement difficult. Site 1 also lies within this corridor.
Alternative 3B	Favourable	This alignment will avoid the cemetery site
WINDFIELD RURAL SUBSTATION TO VILLIERS POWER LINE SECTION		
Alternative 4A	No Preference	Highly modified environment
Alternative 4B	No Preference	Highly modified environment

CHOICE OF SUB-STATIONS

Alternative	Preference	Reasons
PROPOSED NEW SUBSTATIONS		
Alternative 1 - Proposed Northern Tweefort Rural Substation	Not Preferred	Closer to possible heritage sensitive areas.
Alternative 2 – Proposed Southern Tweefort Rural Substation	Favourable	Area is more modified than Alternative 1, next to R34

Conclusion

This study focussed on the evaluation of the heritage significance of several alternative alignments for a 132Kva power distribution line between Villiers and Heilbron via Frankfort in the Free State. The study area is located mainly within highly modified agricultural areas. This has lead to the destruction of most sites within these areas.

The only two sites of heritage significance that could be identified within these corridors were two burial sites. The one site located in the Namahadi Township consists of several thousand graves and should preferably not be traversed. There is an option to follow the township access road, which should avoid the burial sites, however it is suggested from a heritage management point of view that the second alternative 3B to the south be utilised.

The second burial site is much smaller and could easily be avoided through specific pylon placement. It is further recommended that the chosen alternative undergo a walk-down evaluation on the finals pylon placement choice.

Although neither of the proposed alternatives for the placement of the new substation contained any sites of heritage significance, it is recommended that Alternative 2 be selected since it is further removed from possible heritage sensitive areas. Alternative 2 is however also an option for the placement of the substation if other specialist studies indicate this as the best option.

References

Desmond, C: The Discarded People. Penguin, Harmondsworth 1971.

Dreyer, C. 2008. Archaeological and Cultural Heritage Assessment of the Proposed Residential Developments at Namahadi (Frankfort), Free State.

Huffman, T.N. 2007. Handbook to the Iron Age: The archaeology of pre-colonial societies in southern Africa. Scottsville: University of Kwa-Zulu Natal Press.

Maggs, T.M. 1976. Iron Age communities of the southern Highveld. Pietermaritzburg: Natal Museum.

Mitchell, P. 2002. The archaeology of southern Africa. Cambridge: Cambridge University Press.

Platzky, L.; Walker, C: The Surplus People: Forced Removals in South Africa. Ravan Press, Johannesburg 1985.

Sampson, C.G. 1972. The Stone Age Industries of the Orange River Scheme andSouth Africa. National Museum, Bloemfontein: Memoir no. 6.

Schoeman, K. 1982. Vrystaatse Erfenis: Bouwerk en geboue in die 19e eeu. Cape Town: Human & Rousseau.

Smith, A.B. 1995. Archaeological Observations along the Orange River and its Hinterland. In A.B. Smith (ed.) Einiqua/and, pp. 265 - 300. Rondebosch, UCT Press.

Thorp, C.R. 1996. A preliminary report on evidence of interaction between hunter-gatherers and farmers along a hypothesized frontier in the eastern Free State. *The South African Archaeological Bulletin, 51:* 57-63.

Webley, L. 1990. The use of stone 'scrapers' by semi-sedentary pastoralist groups in Namaqualand, South Africa. South African Archaeological Bulletin 45:28-32.

Walton, J. 1953. An Early Fokeng-Hlakoana Settlement at Metlaeeng, Basutoland. *The South African Archaeological Bulletin, 8 (29):* 3 – 11.

Webley, L.; Lanham, J. & Miller, D. March 2010. Scoping Heritage Impact Assessment: Proposed prospecting on 20* farms in the Olifantshoek and Kuruman areas of the Northern Cape.

APPENDIX A

General Methodology

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)*.

Significance Criteria

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 evaluated 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 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)*.

Assessing Impacts

A heritage resource impact may be broadly 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 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 a ***Garmin Colorado*** GPS (WGS 84- datum).

Indicators such as surface finds, 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).

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, geomorphological 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

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?

Indicators of Impact Severity

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 on-going 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.