

**A PHASE 1 HERITAGE IMPACT ASSESSMENT STUDY FOR THE PROPOSED PHOTOVOLTAIC (PV)
SOLAR ENERGY FACILITIES, NEAR EXCELSIOR, FREE STATE PROVINCE.**



Version: 02

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DECLARATION OF INDEPENDENCE

This report has been compiled by Nkosinathi Tomose, appointed Heritage Consultant, for Zone Land Solutions. The views expressed in this report are entirely those of the author and no other interest was displayed during the decision making process for the project.

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EXECUTIVE SUMMARY

Zone Land Solutions (Pty) Ltd was appointed by Savannah Environmental (Pty) Ltd in terms of NEMA, 107 of 1998 (as amended & applicable EIA Regulations of 2010) to conduct a HIA study for the proposed development of Merapi Solar Park, in Merapi, Mantsopa Local Municipality, Free State Province South Africa. Nkosinathi Tomose (the lead archaeologist & heritage consultant) for Zone Land Solutions was instructed (in term Section 38 of NHRA, No. 25 of 1999 (as amended), the NEMA, No.107 of 1998 (as amended & the applicable 2010 Regulations) as well as other applicable legislations) as archaeologist and heritage specialist to conduct a full Phase 1 HIA study for the proposed Merapi Solar Park on following farm: Portion 0 of Farm 311 Ceylon, Portion 0 of Farm 566 Moedersgift, Portion 0 of Farm 1623 Welgegud, Portion 0 of Farm Concordia and Portion 1 of Farm 1547 De Hoop. This reports report is the result of the above integrated process from the various fields of speciality and involvement. The following results, conclusions and recommendations are made about the identified heritage resources based on existing literature about the project area, site survey, SAHRA minimum standards for evaluation and grading of archaeological (and other heritage) resources as well as the NHRA, No 25 of 1999 for the protection, conservation and management of the Nation Estate (Section 3 of the NHRA, No 25 of 1999):

- Five heritage sites were identified near the site (i.e. more than 200m away) and are referred to as: Merap-1, 2, 3, 4 and Merap-5.
- No mitigation measures are proposed for these site because they fall outside the development footprint. However, it is advised that the developer avoid these sites as possible as he/she can.
- The proposed project construction phase should pay special attention to previously un-observed resources or “chance-finds” – these are resources that may be unearthed by the construction excavation activities.
- If such resources are found to occur, the construction activities should be stop and a professional archaeologist should be called onsite to inspect and investigate the finds and make necessary recommendations.
- Furthermore, it is recommended that an Environmental Control Officer should be inducted on heritage management before the commencement of construction activities so that he/she can be able to identify and positively manage any “chance finds” during the construction phase of the project.

Based on existing literature and physical survey of the proposed development area it is the author’s views that the development should be granted a go ahead provided that the developer complies with the above recommendations.

**** Refer to Conclusion section of this report for detailed conclusions and recommendations and proposition on the management of chance finds during the construction phase of the project.***

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ABREVIATIONS

Acronyms	Description
AIA	Archaeological Impact Assessment
ASAPA	Association of South African Professional Archaeologists
CRM	Cultural Resource Management
DEA	Department of Environmental Affairs
DoE	Department of Energy
EIA practitioner	Environmental Impact Assessment Practitioner
EIA	Environmental Impact Assessment
ESA	Early Stone Age
GIS	Geographic Information System
GPS	Global Positioning System
HIA	Heritage Impact Assessment
I&AP	Interested & Affected Party
LSA	Late Stone Age
LIA	Late Iron Age
MSA	Middle Stone Age
MIA	Middle Iron Age
NERSA	National Energy Regulator of South Africa
NHRA	National Heritage Resources Act
NEMA	National Environmental Management Act
PHRA	Provincial Heritage Resources Agency
PHRA-FS	Provincial Heritage Resources Agency-Free State
PSSA	Palaeontological Society of South Africa
ROD	Record of Decision
SADC	Southern African Development Community
SAHRA	South African Heritage Resources Agency
SPV	Special Purpose Vehicle
VIA	Visual Impact Assessment

TERMS & DEFINITION

Archaeological resources

This includes:

- i. material remains resulting from human activity which are in a state of disuse and are in or on land and which are older than 100 years including artefacts, human and hominid remains and artificial features and structures;
- ii. rock art, being any 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 which is older than 100 years, including any area within 10m of such representation;
- iii. wrecks, being any vessel or aircraft, or any part thereof which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the maritime culture zone of the republic as defined in the Maritimes Zones Act, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- iv. features, structures and artefacts associated with military history which are older than 75 years and the site on which they are found.

Cultural significance

This means aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance

Development

This means any physical intervention, excavation, or action, other than those caused by natural forces, which may in the opinion of the heritage authority in any way result in the change to the nature, appearance or physical nature of a place or influence its stability and future well-being, including:

- i. construction, alteration, demolition, removal or change in use of a place or a structure at a place;
- ii. carrying out any works on or over or under a place;
- iii. subdivision or consolidation of land comprising a place, including the structures or airspace of a place;
- iv. constructing or putting up for display signs or boards;
- v. any change to the natural or existing condition or topography of land; and
- vi. any removal or destruction of trees, or removal of vegetation or topsoil

Heritage resources

This means any place or object of cultural significance

1. INTRODUCTION

1.1. Project Background

1.1.1. Developer and Summary of the Proposed Project

SolaireDirect South Africa (Pty) Ltd proposed to establish a commercial photovoltaic solar energy facility on a site located some 5km south-east of Excelsior, the Free State Province, South Africa.

The proposed solar power plant, to be known as Merapi Solar Park, will include photovoltaic (PV) solar panels and associated infrastructure with a total power generating capacity of ~ 300MW. The maximum amount of power to be generated at the proposed power park has been kept at megawatts level inline with the Depart of Energy (DoE) competitive bidding process for procuring renewable energy from Independent Power Producers in South Africa. DoE stresses a threshold amount of megawatts per project entered into bid, and the power generating threshold for a single solar PV facility for submission into a bid has been set at 75 MW. To comply with the above thresholds, the proposed Merapi Solar Park will be split into four phases with each phase constituting 75MW of the total proposed 300MW (*Refer – Appendix 1, BID document*).

1.1.2. Proposed Project Aims

The objective of the proposed PV facility is to evacuate the generated power into the Eskom electricity grid within that province.

This forms part of Eskom strategies to boost its electricity power generation and supply capacity, in the process, providing unlimited energy in the province like the Free State with accelerated growth and development.

1.1.3. Terms of Reference for the Appointment of Archaeologist and Heritage Specialist

Because of the nature and size of the proposed development, power generating park and associated infrastructure to be built in a broader area covering approximately 1505 ha a need to for EIA developed. In terms of the EIA Regulations of June 2010 (Government Notice 543-546 published in terms of the NEMA, No 107 of 1998) the construction of the proposed facilities is listed activity that requires environmental authorisation. As the project comprises a power generation facility with a generating capacity of 20MW or more, and which occupies an area of more than 20ha, the undertaking of an **Environmental impact Assessment process** is required to be undertaken. This process comprises two phases – i.e. Scoping and Impact Assessment - and involves the identification and assessment of environmental impacts through specialist studies, as well as public participation. This process would be relevant for the proposed Merapi PV Facility which is proposed to be up to 300 MW in capacity developed into four phases of 75MW each

Savannah Environmental (Pty) Ltd was appointed by SolaireDirect South Africa (Pty) Ltd as a lead Environmental Impact Practitioner to manage the EIA process and associated impact studies for the proposed development project. Savannah appointed Zone Land Solutions (Pty) Ltd to conduct both VIA and HIA studies for the proposed development as part of specialists impact assessment studies required to fulfil the EIA process and its requirements. Nkosinathi Tomose (the lead archaeologist & heritage consultant) was sub-contracted by Zone Land Solutions to conduct a Phase 1 HIA study for the proposed Merapi Solar Park proposed on the following farms: Portion 0 of Farm 311 Ceylon, Portion 0 of Farm 566 Moedersgift, Portion 0 of Farm 1623 Welgegud, Portion 0 of Farm Concordia and Portion 1 of Farm 1547 De Hoop within Mantsopa Local Municipality, Free State Province (*Figure 1*). The appointment of an archaeologist and heritage specialist is in terms of both the NHRA, No. 25 of 1999 (as amended), the NEMA, No.107 of 1998 (as amended & the applicable 2010 Regulations) as well as other applicable legislations.

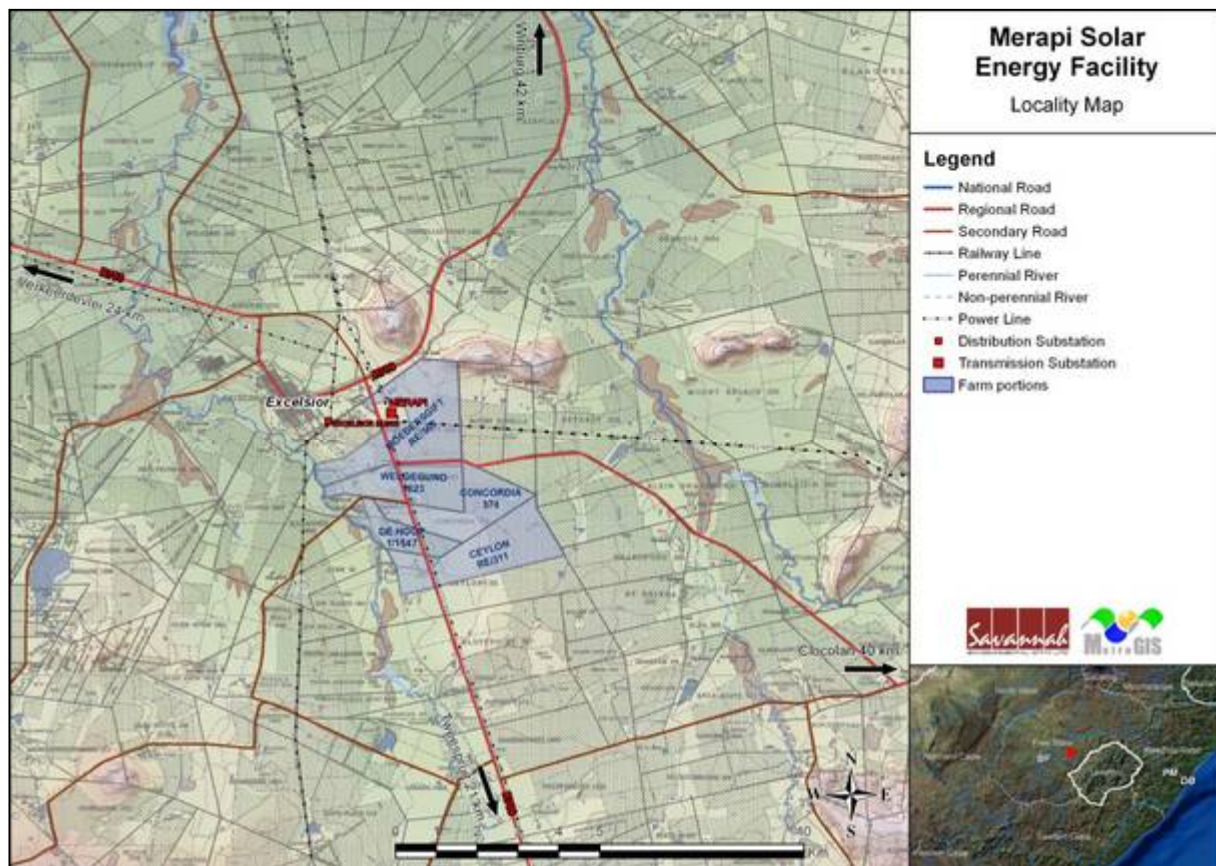


Figure 1 – Propose area of development for the proposed 300WM Merapi Solar Park. Note the existing power transmission Substation marked in red. @ Savannah, 2012.

2. BACKGROUND OF THE STUDY AREA

2.1. Description of the affected environment

The study area is located north-east of the City of Bloemfontein and south-east of the Brandfort (Figure 2). The landscape in which it is located can be defined as generally dry and flat with few ridges and Mountains that that characterises the north of the proposed development area (PDA). Two mountains are found north of Moedersgift- portion of the study fall on the western edge of one of the observed mountains. The PDA is located is located east of Lengana River. A number of roads crisscross the PDA from east to west and south to north. Among the observed roads is R709 (regional road) through the

PDA to Tweespruit some 21km south, R703 to Clocolan some 40km east – this road joins/deviates from R709 on the Farm Welgegund. Another road, a secondary road, joins R709 from the west passing through the farm boundaries of the Farm Welgegund, Farm DeHoop and Farm Concordia.

An Eskom 132kV line passes through the PDA joining Merapi Substation from the south. Another Eskom kV line (275kV) joins Merapi Substation from the north.

The town of Excelsior is located north-west of the study area. Various agricultural activities were observed, ranging from: cattle ranching to sheep herding, with most of the fields used for crops and most probable Millies. A number of natural and man made/alterd perennial water features were observed.

The PDA is generally highly disturbed with various human activities varying from technological (Figures - 4), settlement (Figure - 5), cultural such as burials (Figure), to agricultural (Figures- 6 & 7).

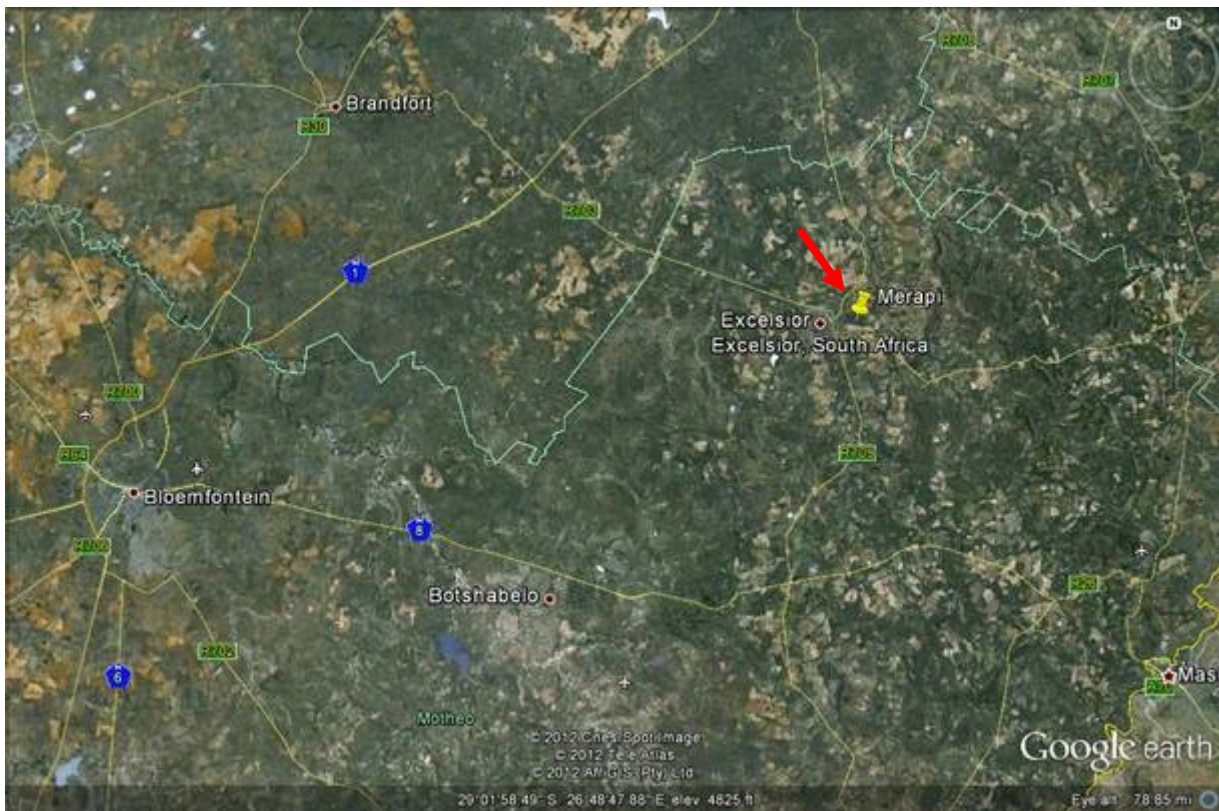


Figure 2 - Location of Merapi in the broader geography of Free State. Note the red arrow pointing to site.



Figure 3- Panoramic view looking of the study area looking down south from the mountain located north and some portion of the Farm Moedersgift.



Figure 4 - Picture of the existing Substation.

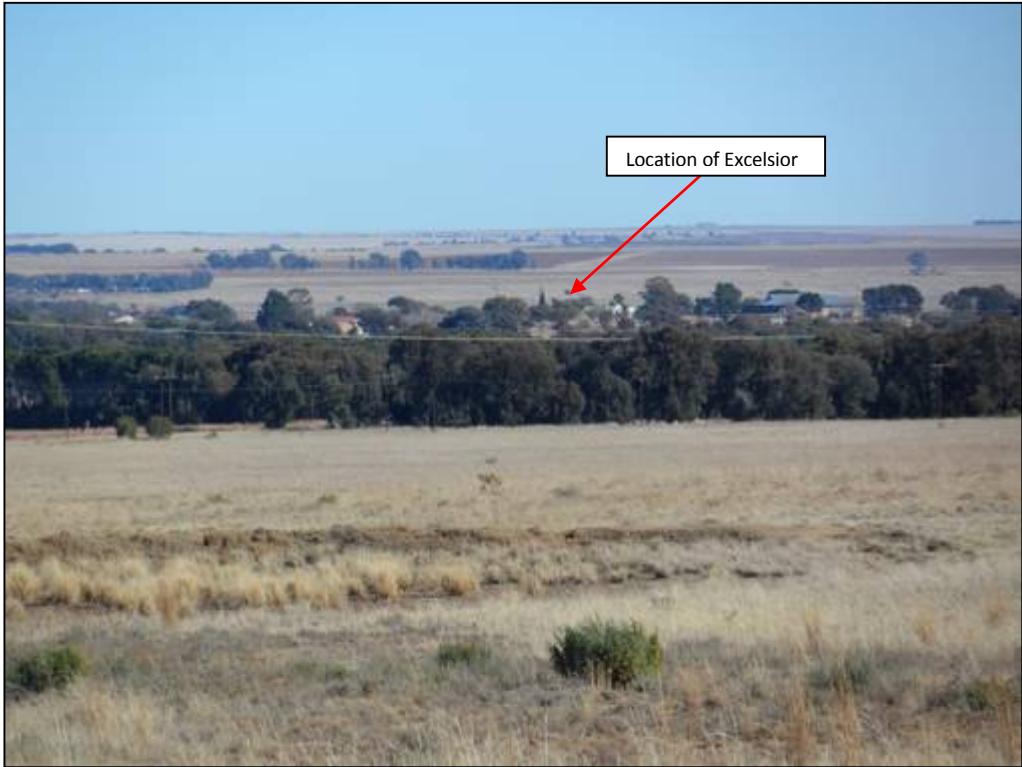


Figure 5 - Picture showing the proximity location of the town of Excelsior from the study area.



Figure 6 -Sheep and cattle.



Figure 7 - Fields use for crops.

2.2. Desktop Study: Archaeological and Heritage

South Africa is rich in diverse forms and types of heritage, ranging from natural to cultural heritage. The natural include among other things palaeontological, geological and the various plant and animal species that define the country. The cultural heritage, which dates as far back as 2.5 million years age (m.y.a), includes - Stone Age Archaeology, Iron Age Archaeology, Historical and Industrial Archaeology, the “Political/Historic” geographies.

2.2.1. Stone Age Archaeology:

The Stone Age archaeology is divided into three categories, namely: the ESA, MSA and the LSA. These Stone Age industries are well documented throughout southern Africa regions including the Free State province where the current study is located. Below are detailed summaries of the traits that characterises each industry artefact and/or material culture.

ESA – Early Stone Age:

The ESA is dated between 2.5m.y.a and 250 k.y.a (thousand years ago) – during this period predecessors of *Homo Sapien Sapiens* started making stone artefacts. The earliest known Stone Age industry is referred to as the *Olduwan Industry*. It derives its name from the first known Stone Age industry

recorded in Olduvai Gorge, Tanzania north-east Africa. Stone artefacts associated with this industry are often described as crude and rudimentary in making – they define the earliest form of Stone Age technological innovation. The Olduvai is replaced, in the archaeological records, by the *Acheulian Industry* some 1.5 m.y.a. The Acheulian is characterised by large cutting tools (also referred to as *bifaces*) - hand axes and cleavers are the dominant forms of artefacts found in this industry.

In the Free State, the earliest known ESA industry is the Victoria West Stone Industry which also spreads to the Northern Cape where it becomes dominant. The Victoria West Stone Industry was first recorded and defined by R. A., Smith in 1915 and in the Free State region it is found along the Vaal River basin. Tools found in this industry included hand axes and what Smith refers to as '*Tortoise Cores*' (Smith, 1920). This was probably Smith reference to the peculiar feature or morphology of *Prepared Cores* – where different pieces of were chipped off from a single piece of parent material to make way for the ultimate removal or shaping of a specific tool and most likely a well defined hand axe. A. H. J., Goodwin (1935) defines the Victoria West Industry with and without cores. Meaning that hand axes and cleavers could have been produced without necessarily have to prepare a parent material to a point to which a single definable tool could be produced. The absence of prepared cores in relation to hand axes and cleaver did not mean the end to this stone tool manufacturing techniques for it become a dominant and defining feature towards the end of the ESA into the MSA (Middle Stone Age). What first became known as '*Tortoise Cores*' was later defined as the transition marker between the ESA and the MSA. Therefore, the *Prepared Cored* of the Victoria West industry can be taken as the markers of transitional period in the Stone Age industry from Acheulian into the MSA, a second clearly defined phase in Stone Age technological innovation. Lycett (2009) sees the Victoria West as an evolutionary step towards the *Levallois Prepared Core Technique* which signifies the outwards spread of the Stone Age technology.

Stone artefacts dated to the above ESA industries are commonly found in open sites as secondary occurrences and/or scatters and not within their primary context. It is there argued here it is important during the survey to pay special attention to open air area that may potential yield some of these artefacts.

MSA – Middle Stone Age:

The MSA stone artefact replace the dominant large and often imposing hand axes and cleavers that characterise the ESA. Such a distinction or transition in archaeological records has this far be dated to 250 k.y.a. During this period, smaller artefacts define the archaeological records and the most dominant ones are flake and blade industry. This period has been defined by some in archaeological circles as a

period that signifies a secondary step towards the modern human behaviour through technology, physical appearance, art and symbolism (e.g. Binneman *et al.* 2011). This industry innovation is suggested to have been at its most probable peak during the last 120 k.y.a. With surface scatters of the flake and blade industries found throughout the southern Africa regions (Thompson & Maream, 2008). They often occur between surface and approximately 50-80cm below ground. Fossil bones may be associated with the MSA in some sites. The flakes and blade industries are often found in secondary context as surface scatters and occurrence like their predecessor industries. Malan (1949) defines the earliest MSA stone industry as the Mangosia and its distribution stretching across the Limpopo, the Qrqualand in Northern Cape, Natal, the Cape Point and the Free State our region of interest in the case. The Prepared Core Technique which had become the defining technological technique of the MSA is in this industry replaced by the Micro Lithics that become a dominant feature or trait in the LSA (Late Stone Age). In the Free State artefacts associated with the Mangosia industry are known to have been made from indurate shale raw material (Binneman *et al.* 2011). They mostly occur as surface scatter. The MSA tools include flakes, blades and points. Their time sequence is often not known because they mostly occur in surface. Other industries within the MSA include:

- The Howieson's Poort which is known to have wide distribution throughout southern African including the Free State province.
- The Orangia 128 to 75 k.y.a.
- Florisbad and Zeekoegat industries dated between 64 and 32 k.y.a - Florisbad is dominant in the Free State province.

Most of the MSA stone artefacts are made from the following materials: fine grain quartzite, quartz, silcrete, chalcedony and hornfels (Binneman *et al.* 2011, see also Binneman *et al.* 2010a). Like the ESA artefacts, the MSA stone artefacts occur in secondary context owing to a variety of reasons. One is due to natural events and/or activities such as erosion and being wash down by water and riverine activities, animal and human disturbances and so forth. It would therefore be in the best interest of the author (and the involved archaeologist and heritage consultant) to pay special attention to exposed surfaces, disturbed pieces of land and along any gullies and down slopes during the survey process.

LSA – Late Stone Age:

The LSA spans a period from 30 k.y.a to the historical time i.e. the last 500 years to 100 years ago. It is associated in archaeological records with the San hunter-gathers. This is particular important for the last 10 k.y.a whereby the San material culture dominate the archaeological records -mostly in rock

shelters, caves as well as open air sites in both the interior and coastal regions. However, the San open air sites are not always easy to find because they are in most cases covered by the various forms and types of vegetation and the other contributing factor is the mobility nature of these people. They were not sedentary like their Iron Age counterparts who need to settle the land for ploughing etc. In the coastal regions, sand dunes sometimes become impediments in locating LSA sites. Owing to all these factors the preservation state of the LSA archaeology is often poor and not easily discernible (Deacon & Deacon 1999). Caves and rock shelters provide a more substantial preservation record of pre-colonial record of indigenous people's archaeology. This is in form of stone artefacts, rock art and other material culture such as beads etc. However, the LSA archaeology was not only dominated by the San hunter-gathers because in some 2 k.y.a the southern Africa landscape was penetrated by the Khoekhoe pastoralist introducing sheep, cattle and goat along with them (e.g. Hall & Smith, 2000). Ceramic vessels are some of the material culture that signifies the Khoekhoe material culture in archaeological records – including the depiction of sheep and cattle often found in San hunter-gather rock art (ibid). Smith and Hall (2000) give detailed descriptions of potential relations that could have taken place between the San, the Khoekhoe and the Iron Age farmers. They also argue that the material culture of the Khoekhoe herders included among other things the art of making rock art in form of geometrics, concentric circles etc. Binneman (*et al.* 2011) asserts that the diet of this new group of people would have also included muscle collected along the muddy river banks, coastal line and riverine and terrestrial foods. Other than the material culture such as artefacts found within the LSA industries, burials or human remains become dominant in the landscape. In the coast they are often found buried underneath middens (dumpsites) (Deacon & Deacon 1999). While in the interior regions they are sporadic and can occur across various features in the landscape.

The LSA archaeology is therefore rich and varied consisting of stone artefacts, other forms of material cultures such as beads (ostrich egg shell beads are dominant), pottery, rock art in form of paintings and engravings with engraving dominating the central low land interior regions but also found elsewhere. Among stone tools, bifaces still continue and are supplemented by tanged barbed arrow heads made from the various materials found with the southern Africa regions. Dark or black fine grained chalcedony would have been the most preferred form of material in the Karoo (Northern Cape regions), the Free State Province and Lesotho (Humphrey, 1969).

Smithfield settlement sites are concentrated among hills and ridges in preference to flat and mountains. Smithfield was divided into three phases using scrapper size and shape (Goodwin & Van Riet Lowe 1929).
Smithfield A – large scrapers

Smithfield B – long and narrow scrappers

Smithfield C – small thumbnail scrappers.

2.2.2. Iron Age Archaeology:

Like the Stone Age this archaeological period is divided into three categories, namely the EIA (Early Iron Age), MIA (Middle Iron Age) and the LIA (Late Iron Age).

The EIA communities first appear in southern African archaeological records in the 1st Millennium AD. The eastern regions of the country were their preferred regions because of their rainfall patterns – summer rainfall climates conducive for ploughing and growing crops like sorghum and millet. In the interior region the former Transvaal (Limpopo and Gauteng Province) were preferred. In the Free State their first evidence is documented south-eastern region where they came into contact with the San people. Most of existing evidence about the Iron Age communities in the Free State dates to the 16th and 18th when they moved across the Vaal River coming to contact with the San hunter-gather people (Klatzow 1994). Numerous stone wall structures and pottery dating to this period have been recorded and lie on the frontier zone where the San people come into contact with agro-pastoralist (Thorp 1996).

Stonewalls are one major characteristic of the Iron Age people. However, they are not the only characteristic of features of the Iron Age. Huffman (1982) described cattle dug, both vitrified and unverified, as one of the Iron Age traits. He also included pits and burials, with some located inside the cattle kraals (ibid).

Among the well known and documented areas with evidence of the Iron Age farmers in the Free State region is the Caledon River Valley -known to have been settled by the Fokeng group of Iron Age speakers (the Sotho Speakers). The Fokeng are suggested to have later settled in Metlaeeng, after dwelling the foothill of Ntsuana-tsatsi between Frankfort and Vrede (Walton 1953).

North of the Vaal River in what is today known as the Limpopo Province the Iron Age communities are known to have also practice the tradition of making rock art, especially during the last period of the Iron Age characterised by the different encounters between these communities and the colonial settlers. The Makgabeng rock art is known to have depict conflict scenes associated with the Malebogo Wars – war between Chief Malebogo of the Hananwa people and President Kruger of the ZAR.

In the Free State rock art linked to the Iron Age communities by association, it is not directly executed or engraved by them. For example, in the south-eastern Orange Free State recordings of cattle paintings are found, with some depicting conflict scenes – figures include ‘hour-glass’ Sotho shields which Binneman (*et al.* 2011) argues could be referring to the period of unrest in southern Africa called *Imfecane* (or *Difaqane* in some literature). However, it would not be totally truthful to argue that the south eastern Free State only depict conflict paintings of sheep are found. One such site is known to exist on the Farm Kwartelfontein near Smithfield and is found in association with the depiction of cattle (Manhire *et al.* 1986). Other painting include ma walking with hunting dogs etc. Other than rock art, stone walls and pottery – the material culture of the Iron Age communities also includes Iron Implements, traded beads, rainmaking site features, spear sharpening groves on rock surfaces, grinding stones etc (e.g. Huffman, 2007). These are some of the material culture expected to be found in the eastern Free State where our proposed development area for the Merapi Power is located.

2.2.3. Colonial Archaeology:

The Colonial or Historical archaeology is a period in archaeological records that refers to the last 500 years when European settlers and colonialists entered into southern Africa. Bloemfontein is one of the interior towns that were established by the European settlers of Dutch descent – the Afrikaans communities after the Trek from the then Cape Colony to avoid British Administration. Various monuments, statues and memorials associated with this period are found across the Free State province. The same is true with architectural styles found in some of the still standing farmsteads. Also associated with colonial archaeology are two South African Wars commonly known as the Anglo-Boer Wars in the 1860s and in the late 1890s to 1901.

To illuminate the war events that unfolded with the close proximity of the proposed development area of Merapi it is best to understand how such events came about.

On the 10th of January of 1901 the new Commander-in-chief of the British army in South Africa, Lord Roberts and his chief of staff, Lord Kitchener landed in South Africa. On the eve of their arrival in the Cape Colony Roberts and his chief of staff Kitchener had already planned to conquer the two Boer Republics that existed at the time – the Orange Free State and the Transvaal Zuid Afrikaansche Republiek (ZAR). Their strategy was to conquer these republics from the Cape Colony. They would first enter the north and central regions of what is today South Africa through the western railway line

through Kimberly – the primary objective was to first relieve Kimberley. Following the relief of Kimberley Roberts and Kitchener had planned to leave the railway line and attack eastwards into Bloemfontein (Orange Free State Republiek) and later Pretoria (ZAR) in the north. In January 1900 Roberts and Kitchener had managed to gather some 50000 men for their upcoming campaigns – first for the relief of Kimberley, then eastward attack into Bloemfontein and northwards attack into Pretoria. However, this was not to be as easy as one would have, at least from the perspective of Roberts, would be. In Kimberley they would have to first have to defeat General PA Cronje and CR De Wet. On the 15 of February Roberts and Kitchener's men had entered Kimberley, the French Cavalry leading the march. Following few days of battle it is reported that General Piet Cronje had retreated from Magersfontein to Paardeberg with a convoy of wagons – he was later circled here (together with some 4000 men) by Roberts and his men in February 27 1900, following ten days of intense battle between the two sides. The capture of General Piet Cronje was a blow for the Burghers and many fled in despair. The battle was now to advance eastwards towards Bloemfontein where General De Wet had prepared his men, using Poplar Grove on the 7 of March 1900 as the scout point, against the advancing British forces. On the 10 March 1900 the Burghers, under the leadership of General De la Rey, had offered courageous resistance at Driefontein (Abrahamskraal) but had to retreat before they could be outflanked by the Brits. Such a retreat would have strengthened the advancement of the British forces under Lord Roberts and his chief of staff because on the 13 March they had occupied Bloemfontein with little resistance from Burghers there. Similar advancement by the British forces had been gaining momentum and their advancement into the interior regions was becoming inevitable. In Natal Buller had advanced against General Botha in Ladysmith, the Hlangwane Hills, the Thukela River and northeast of Colenso. The same was true what is today the North West Province – on the 17 of May 1900 Conel BT Mahon and Conel Plumer had captured Mafikeng. This fragmented the Boer resistance in against the advancing British forces and they had to find new ways of fighting the war and used the Commando strategy (the Guerrilla war tactic) abandoning the wagon laagers. This strategy was first adopted in Kroonstad on the 17 March 1900 following a joint council meeting of war. The Commando strategy proved to be effective and many Burghers were now stimulated to fight the war. The east of the Free State and Bloemfontein was also not immune to the war events. Following a brief leave of absence that the Burghers had experienced in the request of General De Wet they regroup on the 25 March 1900, 10 days following the capture of Bloemfontein of the 13 of March that same year. Now Chief Commandant of the Orange Free State, General De Wet was using the Commando strategy in his frequent attacks of the British forces, primary targeting isolated British Columns.

Using the new Commandos tactic, Chief Commandant De Wet defeated British forces under Brigadier-General RG Broadwood in Merappos, some 28km east of Bloemfontein. This is in close proximity to the proposed development area. In this battle the British lost 159 men with the Boer Commandos only losing 13 – a huge and significant blow to the British.

The defeated British garrison in Merappos had been protecting the Merappos water works, the main water supply to the newly captured Bloemfontein by the British forces.

A monument commemorating this event has been established and it's currently used as one of the tour attractions of the Free State province battle field's tours. Other archaeological remains associated with these periods of unrest in the Free State province are expected to be found in areas in and around the proposed Merapi Solar Park. At times there is a peculiar form of rock art that is associated with this period if we use the 100 years period to distinguish rock art and graffiti – the War Inscriptions often found in mountainous or hill sites where soldiers involved in the war would have found defence and inscribed their names on the rocks as either their pastime activities or document their frustration with the status quo at the time. As such one needs to be also wary of such sites during the survey.

Finds from recent HIA of the study area and its surrounding:

A recent Study by Van Schalkwyk (2011) titled: *Heritage Impact Assessment for the Proposed 275kV Electricity Transmission Line, Everest to Merapi Substations, Free State Province*, makes a number of observations in and around Merapi. These include the identification of built environment and landscape features of the town on Excelsior whose ground was laid in 1910. A number of archaeological sites are also mentioned and they include: Iron Age and grave sites north east and east of the town of Excelsior up to Winburg and above (Appendix B). A rock site in Cannibal Cave near Merapi is also referred to (Van Schalkwyk, 2011).

3. METHODOLOGY

3.1. Legislative Requirements

The NEMA, No. 107 of 1998 stipulated that for any development in South Africa to be granted permission to go ahead an impact assessment of the potential impacts of the proposed development on both the natural and cultural environment need to be conducted. As such this HIA fulfils the

requirements of NEMA and is conducted inline with Section 38 (1) of the NHRA, No. 25 of 1999. Because of the nature of the proposed development – energy related development the Minerals and Petroleum Resources Development Act (MPRDA) (28 of 2002) is also applicable.

3.2. Methodology

This chapter outline the methodologies used in conducting this study. This HIA report was compiled by Nkosinathi Tomose for the proposed Merappos Solar Farm project. The following steps were following in conducting the study:

3.2.1. Step I – Literature Review:

- The background information of the proposed area of development following the receipt of the BID document and sites maps from the client. Sources used included, but not limited to published academic papers and HIA studies conducted in and around the region where the current development will take place.
- Map Archives: Historical maps of the proposed area of development and its surround were assessed to aid information of the proposed area development and its surround.

3.2.2. Step II – Physical Survey:

- A physical survey of the proposed development area footprint was conducted a qualified archaeologist on the 28 June 2012. The survey was in two fold – some areas of the proposed development footprint were covered on foot while others were traverse in a car. The objective of this was to located and identify sites in the landscape, record them using necessary and applicable tools and technology.
- The survey also paid special attention to disturbed and exposed layers of soils as well as gullies and eroded surfaces because these areas are more likely to exposed or yield archaeological resources.
- The following technological tools were deemed important for documenting and recording located and/or identified sites:
 - Garmin GPS – to take Lat/Long coordinates of the identified sites
 - Lenovo ThinkPad aided Garmin Basecamp Software – to plot the identified sites and assess site boundaries
 - Samsung – to take photos of the affected environment and identified sites

3.2.3. Step III – Data Consolidation and Report Writing:

This stage of the report considered both heritage sites significance assessment and basic assessment criteria for the assessment of heritage significance and assessment of potential impacts of the identified and mapped heritage resources from the proposed development project – Merapi PV Solar Plant. This methodological proved important for the study. Below is the chronological alignment of steps followed in the process of compiling this report:

- The final step involved the consolidation of the data collected using the various sources as recommended above.
- This involved the manipulation of the recorded GPS coordinates for plotting of GIS maps of the identified heritage sites within and adjacent to the proposed development footprint.
- Assessing the significance and potential impact of the identified sites, discussing the finds, report writing and making recommendation of the management and mitigation measures of the identified sites as well as the impact and influence of heritage in the proposed development area.

3.2.3.1. Assessment of site significance

The significance of heritage sites was based on four main criteria:

- Site integrity (i.e. primary vs. secondary context)
- Amount of deposit, range of features (e.g., stonewalling, stone tools and enclosures)
 - Density of scatter (dispersed scatter)
 - Low - $<10/50\text{m}^2$
 - Medium - $10-50/50\text{m}^2$
 - High - $>50/50\text{m}^2$
- **Uniqueness** and
- **Potential** to answer present research questions.

Management actions and recommended mitigation, which will result in a reduction in the impact on the sites, will be expressed as follows:

- A - No further action necessary;
- B - Mapping of the site and controlled sampling required;
- C - No-go or relocate pylon position
- D - Preserve site, or extensive data collection and mapping of the site; and

- E - Preserve site

Impacts on these sites by the development will be evaluated as follows:

Site Significance

The following site significance classification minimum standards as prescribed by the SAHRA (2006) and approved by the ASAPA for the SADC region were used for the purpose of this report.

Table 1: Site significance classification standards as prescribed by SAHRA

FIELD RATING	GRADE	SIGNIFICANCE	RECOMMENDED MITIGATION
National Significance (NS)	Grade 1	-	Conservation; National Site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; Provincial Site nomination
Local Significance (LS)	Grade 3A	High Significance	Conservation; Mitigation not advised
Local Significance (LS)	Grade 3B	High Significance	Mitigation (Part of site should be retained)
Generally Protected A (GP.A)	-	High / Medium Significance	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium Significance	Recording before destruction
Generally Protected C (GP.A)	-	Low Significance	Destruction

3.2.3.2. Methodology for Impact Assessment in terms of *Basic Assessment Methodologies including Measures for Environmental Management Plan Consideration:*

The Basic Assessment 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 Basic Assessment & Environmental Impact Assessment. The impact evaluation of predicted impacts was undertaken through an assessment of the significance of the impacts:

Assessment of Impacts

Direct, indirect and cumulative impacts of the issues identified through the scoping study, as well as all other issues identified in the EIA phase must be assessed in terms of the following criteria:

- ❖ The **nature**, which shall include a description of what causes the effect, what will be affected and how it will be affected.
- ❖ The **extent**, wherein it will be indicated whether the impact will be local (limited to the immediate area or site of development) or regional, and a value between 1 and 5 will be assigned as appropriate (with 1 being low and 5 being high):
- ❖ The **duration**, wherein it will be indicated whether:
 - the lifetime of the impact will be of a very short duration (0–1 years) – assigned a score of 1;
 - the lifetime of the impact will be of a short duration (2-5 years) - assigned a score of 2;
 - medium-term (5–15 years) – assigned a score of 3;
 - long term (> 15 years) - assigned a score of 4; or
 - permanent - assigned a score of 5;
- ❖ The **magnitude**, quantified on a scale from 0-10, where 0 is small and will have no effect on the environment, 2 is minor and will not result in an impact on processes, 4 is low and will cause a slight impact on processes, 6 is moderate and will result in processes continuing but in a modified way, 8 is high (processes are altered to the extent that they temporarily cease), and 10 is very high and results in complete destruction of patterns and permanent cessation of processes.
- ❖ The **probability of occurrence**, which shall describe the likelihood of the impact actually occurring. Probability will be estimated on a scale of 1–5, where 1 is very improbable (probably will not happen), 2 is improbable (some possibility, but low likelihood), 3 is probable (distinct possibility), 4 is highly probable (most likely) and 5 is definite (impact will occur regardless of any prevention measures).
- ❖ the **significance**, which shall be determined through a synthesis of the characteristics described above and can be assessed as low, medium or high; and
- ❖ The **status**, which will be described as either positive, negative or neutral.

- ❖ The degree to which the impact can be reversed.
- ❖ The degree to which the impact may cause irreplaceable loss of resources.
- ❖ The *degree* to which the impact can be *mitigated*.

The **significance** is calculated by combining the criteria in the following formula:

$$S = (E+D+M)P$$

S = Significance weighting

E = Extent

D = Duration

M = Magnitude

P = Probability

The **significance weightings** for each potential impact are as follows:

- ❖ < 30 points: Low (i.e. where this impact would not have a direct influence on the decision to develop in the area),
- ❖ 30-60 points: Medium (i.e. where the impact could influence the decision to develop in the area unless it is effectively mitigated),
- ❖ > 60 points: High (i.e. where the impact must have an influence on the decision process to develop in the area).

Assessment of impacts must be summarised in the following table format. The rating values as per the above criteria must also be included.

Example of Impact table summarising the significance of impacts (with and without mitigation)

Nature:		
	Without mitigation	With mitigation
Extent	High (3)	Low (1)
Duration	Medium-term (3)	Medium-term (3)

Magnitude	Moderate (6)	Low (4)
Probability	Probable (3)	Probable (3)
Significance	36 (Medium)	24 (Low)
Status (positive or negative)	Negative	Negative
Reversibility	Low	Low
Irreplaceable loss of resources?	Yes	Yes
Can impacts be mitigated?	Yes	
Mitigation: Mitigation Measures		
Cumulative impacts: Cumulative Impacts		
Residual Impacts: Residual Impacts		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE: Description of the objective, which is necessary in order to meet the overall goals; these take into account the findings of the environmental impact assessment specialist studies

Project component/s	List of project components affecting the objective	
Potential Impact	Brief description of potential environmental impact if objective is not met	
Activity/risk source	Description of activities which could impact on achieving objective	
Mitigation: Target/Objective	Description of the target; include quantitative measures and/or dates of completion	
Mitigation: Action/control	Responsibility	Timeframe
List specific action(s) required to meet the mitigation target/objective described above	Who is responsible for the measures	Time periods for implementation of measures
Performance Indicator	Description of key indicator(s) that track progress/indicate the effectiveness of the management plan.	
Monitoring	Mechanisms for monitoring compliance; the key monitoring actions required to check	

whether the objectives are being achieved, taking into consideration responsibility, frequency, methods and reporting

4. ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations exist in terms of the present study:

- The current study is a Phase 1 Heritage Impact Assessment. As such, a historical and archival desktop study as well as a field survey were undertaken to identify tangible heritage resources located in and around the proposed area of development. No semi-formal discussions took place with any farm owners or people located within the Merapi site. The only such discussion took place between Nkosinathi and a librarian at Excelsior Library and gave the interviewer a Scoping Document containing an HIA about an Eskom 275kV line project of the area (refer to background search section above).
- The Deed search at the National Archives in Pretoria also did not yield any information about previous farm owners of the farms affected – this may limit the study in terms of understanding the different cultural activities that took place in the affected farms and why such activities took place. As such as some of the area’s intangible heritage and stories maybe be missing.

5. FINDINGS

The findings of this study are presented in three ways as per the search and other methodological methods used in conducting it. Such as map and deeds search as well as the physical survey of the proposed development areas (PDAs).

5.1. Maps

A number of observations are made of the evolution of the landscape in and around Merapi PDAs. The farms in which the Merapi site is located have experience some level of subdivisions when one compares the 1909/14 area map with the recent topography map of the area or region:

The 1909/1913 map shows that the Farm Concordia extends to just above the Farm Moedersgift (*Figure 8*) The Farm Ceylon has also experienced the subdivision when one compares the 1909/14 map with the recent topographic map. In the 1909/14 map a number of 'ruins' most likely huts/roundavels are observed and this includes a number of farmsteads as well as the town of excelsior (*Figure 8*). This gives the farmsteads and ruins a +/- 100 year date. Few roads that crisscross the site of Merapi which exist up to this date are also observed in the 1909/14 map.

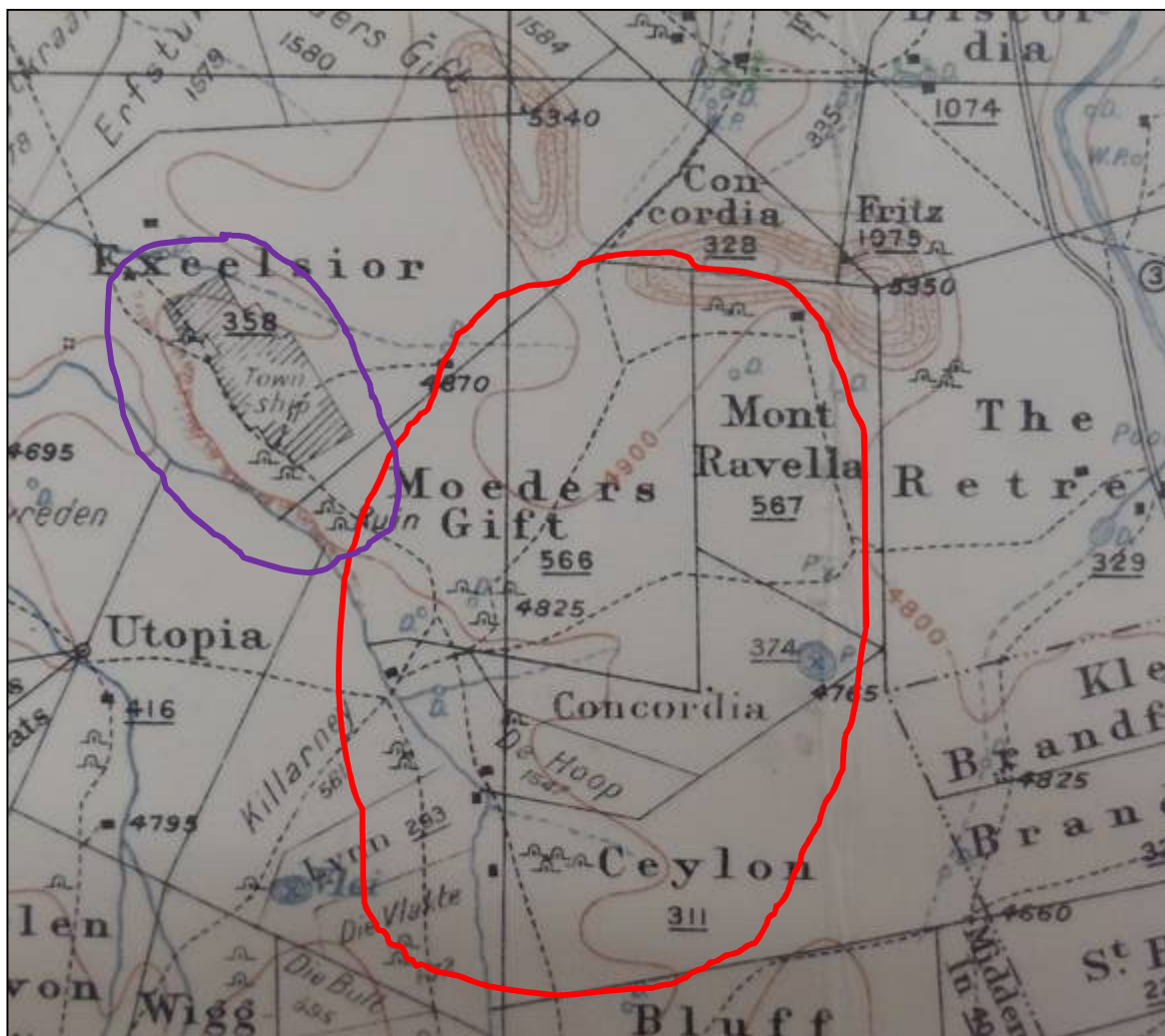


Figure 8 - Map of Merapi Site (ensconced within the red outline) and the Township of Excelsior ensconced within the purple outline . Surveyed by the Colonial Survey Section, R. E., 1909. Cadastral work compiled in the Surveyor General's Office, Bloemfontein. 1914. Engraved by Mess^{rs}. W&A.K. Johnston, L^{td}.Edinburgh, and Printed at the War Office, 1920. @ Wits Cullen Library, Map Archives, 2012.

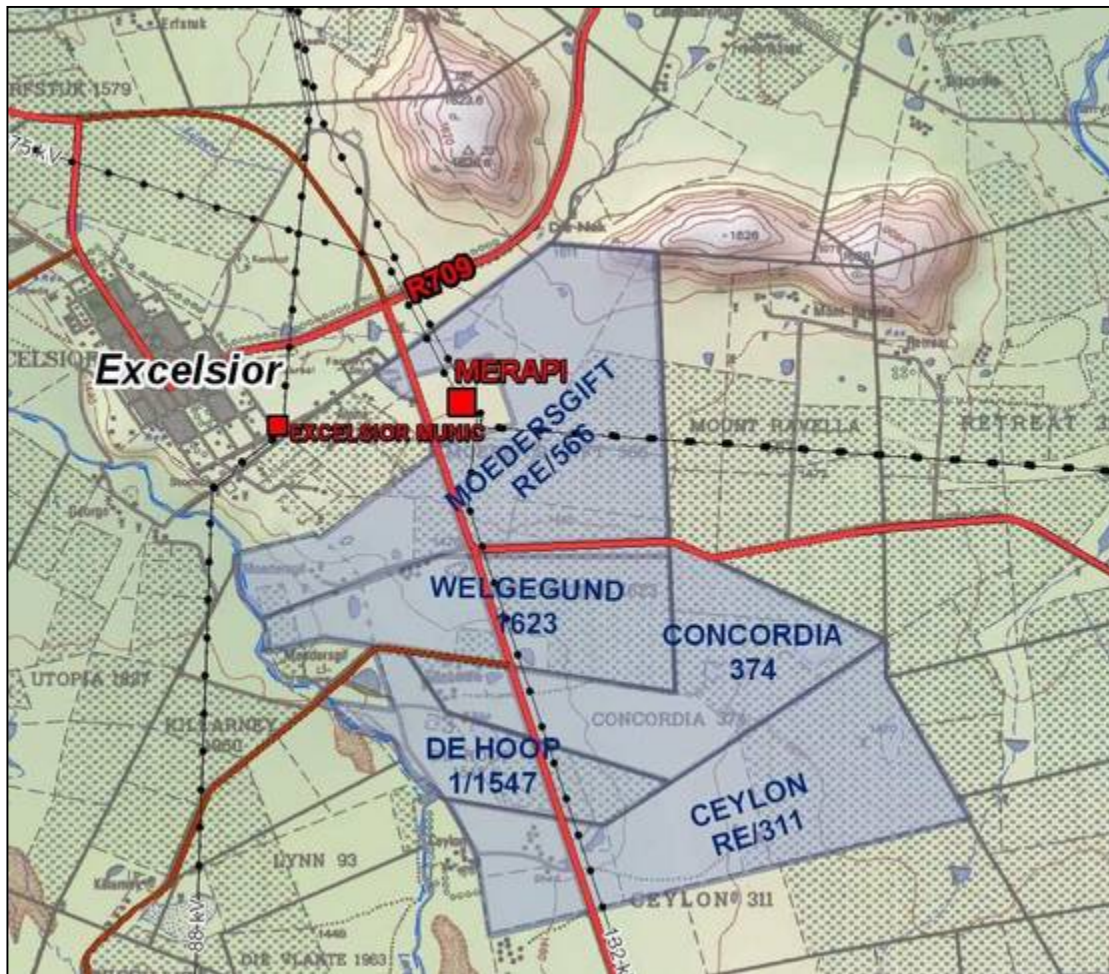


Figure 9– Moedersgift RE/566, Welgegund 1623, Concordia 374, De Hoop 1/1547, and Ceylon RE/311. Note the town of Excelsior north east of Merapi PDA @ Savannah, 2012.

5.2. Deeds Search:

The Deeds search of the following farms took place at the National Archive in Pretoria: Moedersgift RE/566, Welgegund 1623, Concordia 374, De Hoop 1/1547, and Ceylon RE/311. However, the search did not yield any results regarding the farm owners both current and previous owners. When staff members at the National Archives were approached they suggested that the reason for this was that the farms are located in a different province and they only housed archival material of the former Transvaal. However, the archival maps obtained at the Cullen Library Wits University are deemed sufficient enough to reveal information about the proposed development area tangible resources sites.

5.3. Field Survey:

The physical survey of the PDA made a number of observations about the Merapi site and itself landscape as described in the affected environment section above. Apart from this, approximately five historic and heritage resources site were identified during the physical survey of Merapi sites. The sites are named and numbered Merap-1 to Merap-5. Below is the description of each site, evaluation of its significance, impact ratings and recommended management/mitigation measures.

5.3.1. Identified: Sites their description and evaluation

Merap-1

Site Type: Old Village Site

GPS: S28 57 18.5 E27 04 50.3 (WGS -84)

Site Description:

The site is basically only village stone foundations, possible kraals and ash dumps (*Figure 10*). The measures area of approximately 1000 to 1500m²- however, it can be bigger than this (*Figure 11*). Few recent mud structures are found within the village site and these presumable are of people trying to resettle the site. Material culture revealed includes recent enamel bowl and agricultural implements (*Figure 12*).

Approximate Age: +/-100 years old and younger

Section of the NHRA, No 25 of 1999: Section 34 & 35

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Impact	Impact Significance	Heritage Significance	Certainty	Duration	Mitigation
Localised	low	Generally protected (GP.B)	Improbable	Short-term: Construction phase	B

Nature: the destruction of the old village remains (foundation, associated structures & features such as ash dumps & middens) as the result of project construction activities.		
	Without mitigation	With mitigation
Extent	Local (5)	Local (3)
Duration	Medium-term (3)	Short-term (2)
Magnitude	Very high (10)	Moderate (6)
Probability	Definite (5)	Definite (5)
Significance	(90) High	(55) Medium
Status (positive or negative)	Negative	Positive
Reversibility	Low	Moderate
Irreplaceable loss of resources?	Yes	No
Can impacts be mitigated?	Yes	
Mitigation: A full documentation and recording (& sampling should be applied for with SAHRA-APM Unit) of the village should be conducted in a form of Phase 2 HIA study prior to the commencement of project construction activities.		
Cumulative impacts: The integrity of the site will be affected by development around it should the developer not adopt the above mitigation measure and decide to construct around it.		
Residual Impacts: Site integrity will highly compromised should the proposed mitigation measure not be adopted and implemented. This will include destruction of the site and its resources.		

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE:

The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development footprint. In order to achieve this goal it is recommended that the historic village be fully documented and recorded – a permit for documentation, recording and sampling permit should be applied for with SAHRA-APM Unit before the construction activities affect it. This should be done in the planning phase.

Project component/s	Construction and operational phases of the project
Potential Impact	Disturbance and destruction of the site and all its associated resources and loss of historical archaeological record
Activity/risk source	Failure by the developer to adopt the recommended mitigation measures for inclusion in the Environmental Management Plan
Mitigation: Target/Objective	With the approval of the project – a Phase 2 HIA Study should be conducted with the aim to fully record and document the site as a mitigation measure prior to the commencement of construction activities. This should be met in the project planning phase.

Mitigation: Action/control	Responsibility	Timeframe
With the approval of the project, the Environmental Consultant and/or appointed ECO should consult with an archaeologist/heritage consultant (preferable the one already familiar with the project) to conduct a full Phase 2 study for the site before its destruction (i.e. including applying for destruction permits with the relevant authority)	Appointed archaeologist/heritage consultant	Prior to the project construction phase – in the planning phase.

Performance Indicator	The type of indicator used here will be Actionable Indicators – this will measure action/progress in terms of completion of the above objectives with the approval of the project against their actual implementation.
Monitoring	With the approval of the project, the Environmental Consultant should appoint a suitable archaeologist/heritage consultant (preferable the one already familiar with the project) to conduct a full Phase 2 study for the site before its destruction (i.e. including applying for destruction permits with the relevant authority). Following the adoption and implementation of this mitigation measure there will be no need to further monitor the site during construction phase. Except when there are chance finds such a baby/infant burials within some of the foundations in which case ECO should stop construction and report the finds to the Environmental Consultant who will then have to contact an archaeologist to come inspect and investigate the finds.



Figure 10 - Stone foundations found at the site



Figure 11 – Example of the distribution of stone foundations that make up the village site.



Figure 12- mud ruin found in association with the site. Note the blue enamel bowl, right.

Merap- 2

Site Type: Cemetery

GPS: S28 57 22.1 E27 04 52.7 (WGS-84)

Site Description:

The site is none municipal formalised cemetery and is found located some 50m from the village site (Merap-1). The cemetery is most likely to be of Merap-1 dwellers and it consists of approximately 90 graves (*Figure 13*). The graves have different headstones and dressings, varying from simple soil mound, to stone headstone and dressing, stone mounds and granite headstones and dressings (*Figure 14*). One of the headstones dates to the 1940s - 1948 to be precise (*Figure 15*). However, some of the graves look to be older than the one dated 1948. Various family names were recorded and include the following: Gras, Matjelemane and Williams.

Approximate Age: +/- 100 years (if associated with Merap-1)

Section of the NHRA, No 25 of 1999: Section 36

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Impact	Impact Significance	Heritage Significance	Certainty	Duration	Mitigation
Localised	Low	Generally Protected A (GPA)	improbable	Long-term : Construction	D/E



Figure 13- Approximate size of the cemetery, Merap-2.



Figure 14 - various forms of grave headstones and dressings



Figure 15 - Matjelemane family grave with a 1948 death date.

Merap- 3

Site Type: Ruins

GPS: S28 57 23.1 E27 04 29.4 (WGS-84)

Site Description:

The site consists of 3 ruin structures built using red corobrik, dressed/covered in cement painted white. No door or window frames were found to give a relative date of the ruins (*Figure 16*)

Approximate Age: +/- 100 years old

Section of the NHRA, No 25 of 1999: Section 34

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Impact	Impact Significance	Heritage Significance	Certainty	Duration	Mitigation
Localised	Low	Generally Protected C (GP.C)	Improbable	Short-term: construction phase	A



Figure 16 – Ruins located some 500 + from Merap-1.

Merap-4

Site Type: Historic Farmstead (ruins)

GPS: S28 57 21.3 E27 04 22.2(WGS-84)

Site Description:

The historic farmstead (ruins) is characterised by tall and matured trees from a distance (*Figure 17*). It consists of buildings of various size and possible uses. The main farm house ruins show that it

was built using sandstone and possibly from local material – the craftsmanship of stone mason is evident in the stone bricks and lintels (*Figure 18*). Other features found in association with the farmstead ruins are cement reservoir, what looks to have been a swing pool and ponds as well as the drainage systems (*Figure 19*).

Approximate Age: +/- 100 years old

Section of the NHRA, No 25 of 1999: Section 34

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Impact	Impact Significance	Heritage Significance	Certainty	Duration	Mitigation
Local/region	Low	Generally Protected C (GP.C)	Improbable	Short-term: construction phase	A

Nature: the disturbance/destruction of the historic farmstead (ruins) may occur (e.g. secondary impact) as a result of construction activities and development of associated infrastructure.		
	Without mitigation	With mitigation
Extent	Local (3)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Low (0)	Low (0)
Probability	Improbable (1)	Improbable (1)
Significance	(5) Low	(3) Low
Status (positive or negative)	Positive	Positive
Reversibility	Low	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	For current project (No) and for future projects (Yes)	
Mitigation: There is not immediate mitigation measure proposed for the historic farmstead (ruins) although it is significant in terms of its potential to yield information about the architectural vernacular of the area and region. The historic farmstead		

fall outside the proposed development footprint of the project. However, should future developments extend to the area where the farmstead is located – full documentation and recording should be conducted; this should include its architectural layout, definition of its vernacular etc.

Cumulative impacts: *Cumulative impacts are predicted for the historic farmstead (ruins) as a result of construction activities – these will be secondary since the farmstead fall outside the project development footprint.*

Residual Impacts: *Portions/parts of the historic farmstead (ruins) will be indirectly impacted by construction activities and associated infrastructure – these may include visual dwarfing of the whole farmstead.*

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE:

The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development footprint. *There is not immediate mitigation measure proposed for the historic farmstead (ruins) although it is significant in terms of its potential to yield information about the architectural vernacular of the area and region - the historic farmstead fall outside the proposed development footprint of the project. However, should future developments extend to the area where the farmstead is located – full documentation and recording should be conducted; this should include its architectural layout, definition of its vernacular etc.*

Project component/s	N/A
Potential Impact	N/A
Activity/risk source	N/A
Mitigation: Target/Objective	N/A

Mitigation: Action/control	Responsibility	Timeframe
N/A	N/A	N/A

Performance Indicator	N/A
Monitoring	N/A



Figure 17- Tall and matured trees that characterise the farmstead from a distance.



Figure 18 - South facade of the farmstead main farm house ruins. Note the red brick additions. Also note the white paint that dresses some of the sandstone bricks as well as the brick addition and the inside.



Figure 19 - Other site noticeable features such as the drainage system, reservoir, brick additions etc

Merap 5

Site Type: Farmhouse ruins and disturbed area

GPS: S28 57 47.3 E27 04 22.9 (WGS-84)

Site Description:

The site consists of one farm house ruin and behind it is a disturbed area characterised by Agave plants (Figure 20). No other features were recorded, but the Agave plants are indicative of graves or ash mounds or midden locations.

Approximate Age: Over 60 years to 100 years old

Section of the NHRA, No 25 of 1999: Section 34 & 35

Nature of Impacts, Assessments & Predictions in terms of Standard Heritage & Basic Assessment (i.e. adopted from Standard Environmentally Basic Assessment Guidelines):

Impact	Impact Significance	Heritage Significance	Certainty	Duration	Mitigation
Local/regional	Low	Generally Protected C (GP.C)	Improbable	Short-term: construction phase	A

Nature: the disturbance/destruction of the historic farmhouse (ruins) and 'disturbed area' may occur (e.g. secondary impact) as a result of construction activities and development of associated infrastructure.

	Without mitigation	With mitigation
Extent	Local (3)	Local (1)
Duration	Short-term (2)	Short-term (2)
Magnitude	Low (0)	Low (0)
Probability	Improbable (1)	Improbable (1)
Significance	(5) Low	(3) Low
Status (positive or negative)	Positive	Positive
Reversibility	Low	Low
Irreplaceable loss of resources?	No	No
Can impacts be mitigated?	For current project (No) and for future projects (Yes)	

Mitigation: There are not immediate mitigation measures proposed for the historic farmhouse (ruins) and the 'disturbed area' although the house structure or layout may be of significance in terms of its potential to yield information about the architectural vernacular of the area and region. The historic farmhouse (ruins) and the 'disturbed area' fall outside the proposed development footprint of the project. However, should future developments extend to the area where the historic farmhouse (ruins) and 'disturbed area' are located– full documentation and recording of the farmhouse (ruins) should be conducted; this should include its architectural layout, definition of its vernacular etc. For the 'disturbed area' a sampling permit will need to be applied for with SAHRA-APM Unit to investigate it.

Cumulative impacts: No cumulative impacts are predicted for the structure during the construction phase of the project, provided that construction activities do not affect the farmstead. Neither are there any significant cumulative impacts predicted for the operation phase of the project except for the visual dwarfing of the whole farmstead.

Residual Impacts: The residual impact will be visual dwarfing of the whole farmstead

Measures for inclusion in the draft Environmental Management Plan:

OBJECTIVE:

The overall goal is to identify, manage and conserve heritage resources within and immediately outside the proposed development footprint. *There are not immediate mitigation measures proposed for the historic farmhouse (ruins) and the 'disturbed area' although the house structure or layout may be of significance in terms of its potential to yield information about the architectural vernacular of the area and region. The historic farmhouse (ruins) and the 'disturbed area' fall outside the proposed development footprint of the project. However, should future developments extend to the area where the historic farmhouse (ruins) and 'disturbed area' are located— full documentation and recording of the farmhouse (ruins) should*

Project component/s	N/A
Potential Impact	N/A
Activity/risk source	N/A
Mitigation: Target/Objective	N/A

Mitigation: Action/control	Responsibility	Timeframe
N/A	N/A	N/A

Performance Indicator	N/A
Monitoring	N/A



Figure 20 – Farmhouse ruin and disturbed area characterised by Agave plants.

6. DISCUSSION

The desktop study yielded information about the existence of heritage resources in the Free State regions. This included archaeological, historical and industrial heritage resources. The south-eastern Free State Province region proved, from a desktop search point of view, to be the most saturated region with known archaeological resources. This study falls directly north-east of the Free State Province capital Bloemfontein and just south-east of Winburg. A number of archaeological resources site have been identified in the area between Winburg and Excelsior by Van Schalkwyk (2011) – these site include Iron Age, cemeteries and a reference to rock art in Cannibal Cave near Merapi. No Stone Age, Iron Age sites, or rock art sites where identified during the physical survey of Merapi proposed development area. The only sites identified include, a grave site in form of cemeteries (none municipal formalised) and historic built environment and landscape features and sites (*Figure 21*). The built environment and landscape sites were given a relative date of +/- 100 years old based on their existing on the 1909/14 map of Merapi area. However, this is not conclusive to all built environment and landscape features identified as some were more recent in nature. All the identified sites were given a local grave and their field rating and significance varied between GP.A (High/Medium Significance) to GP.C (Low Significance). No further action is proposed for the identified sites.

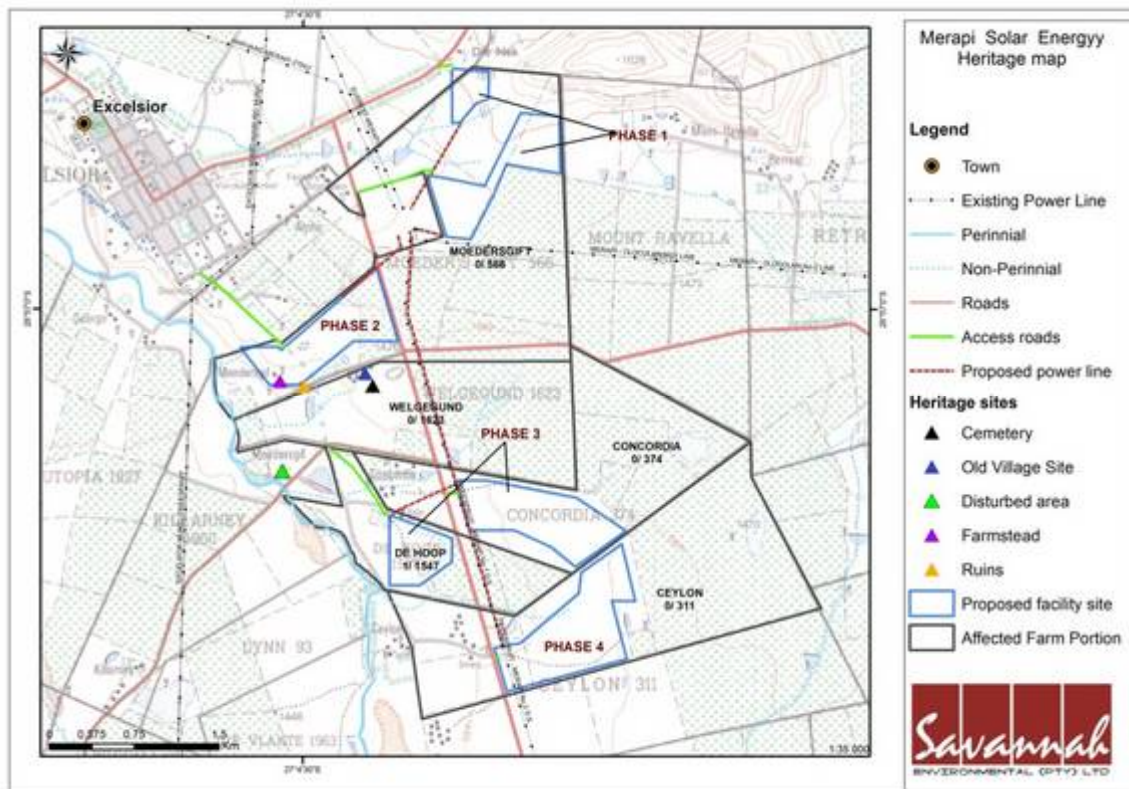


Figure 21 - Location of the identified heritage resources in Merapi PDA - the site are located on Farm

7. CONCLUSIONS

The physical survey of the PDA yielded five heritage resources sites, namely: Merap-1, Merap-2, Merap-3, Merap-4 and Merap-5.

- All the identified site are given a relative date of +/- 100 years based on tangible evidence of a map (1909/14) showing existence of various farmsteads and huts.
- Based on field rating and significance only two sites are deemed worthy of recording however they will be directly affected by the proposed development – Merap-1 and Merap-2 Therefore no mitigation measures are proposed.
- No further action is proposed for Merap-3, 4 and 5 and the development should avoid them

In conclusion, based on the results yielded by both the archaeological and heritage resources desktop study and physical survey of the PDA:

- It is the author's views that the proposed development can go ahead as planned in terms of heritage resources management and planning provided that it adheres to the propositions and recommendations made about Merap-1 and Merap-2.
- However, due to subterranean nature of some archaeological resources and sites and that such site could have not be observed during the physical survey of the PDA, the following recommendations are made:
 - It is recommended that the proposed project construction phase should pay special attention to possible encounter of archaeological resources and sites such as unmarked graves or stone and iron implements (dating to Iron Age and to events of the Second South African War as discussed above).
 - Should such sites be discovered during the construction phase, construction activities need to be stopped with immediate effect and a professional archaeologist need to be called on site to inspect and investigate the finds and make recommendations on further actions that need to take place to rescue or mitigate the finds. For example, applying for rescue permits with SAHRA-BGG Unit in case of discovery of unmarked graves and SAHRA-APM Unit in case of archaeological and palaeontological remains.
 - To achieve the above two recommendation – it is further recommended that an Environmental Control Officer should be inducted on heritage management before the commencement of construction activities and that he/she should be to take responsibility for heritage sites and resources during the construction phase of the project.

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9. APPENDIX 1- Heritage Sites north and east of Excelsior, after Van Schalkwyk 2011.

