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**FINAL REPORT ON THE SPATIAL DOCUMENTATION OF THE
MAKAHANE ARCHAEOLOGICAL SITE IN THE KRUGER
NATIONAL PARK, 2231AC MABYENI**

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SUMMARY

The African Conservation Trust received funding for the digital documentation of Makahane Ruins in the Kruger National Park. Part of this project was the use of cutting edge technology such as 3D laser scanning, GIS mapping and high resolution photography for the comprehensive digital documentation of the Makahane Ruins. These methods not only preserve the site for future generations, but also provide highly accurate baseline data for change monitoring. Being able to explore the site in 3D and interrogate the site in a way not previously possible will also greatly assist to inform management and conservation plans. A SANParks research permit was obtained to conduct this project (Permit number: RADA1397).

The digital modelling of the Makahane Ruins incorporating the use of 3D laser scanning, terrestrial and aerial photography was done based on fieldwork completed in August 2017. A virtual computer model of the site consisting of hundreds of millions of measured points each with an xyz coordinate was created and sets of digital images covering the whole site were taken. The 360° panorama images have been used to create an interactive virtual tour for display on the internet.

This report is the result of the 2017 fieldwork and office based processing of the acquired data. It also provides recommendations regarding the preservation and management of the site and its sustainable utilization in terms of tourism, research and educational programs.

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1. INTRODUCTION

The African Conservation Trust received funding from the National Heritage Council for the digital documentation of Makahane Ruins in the Kruger National Park.

The aims of the 2017 field work were the 3D laser scanning, GIS mapping and aerial and terrestrial photography for the comprehensive digital documentation of the stonewalling at the site. We also assessed the archaeological and historical significance of the site according to the criteria set in the National Heritage Resources Act, No 5 of 1999. Additional stone walling was identified in the proximity of the core site during a follow up visit in October 2017.

Certain factors such as very dense vegetation in certain sections, inaccessible areas (no roads, mountainous) and restricted areas (due to the presence of dangerous animals for instance) was taken into consideration, but did not limit the final results of the work.

2. TERMS OF REFERENCE

The Terms of Reference for the study were:

- 3D laser scanning.
- Aerial photography
- Virtual tour
- Assess the site's significance.
- Provide a set of management recommendations related to the site.
- A report.

3. METHODOLOGY

3.1. Survey of literature

A survey of available literature was undertaken to place the study area in an archaeological and historical context. The sources utilized in this regard are indicated in the bibliography. Unfortunately, very little published and unpublished reports on Makahane exist.

3.2. Field work

The field work was conducted according to generally accepted practices, in the company of an archaeologist, and aimed at the digital recording of the site and features of heritage significance.

3.3. 3D Laser scanning

3D laser scanning is a non-invasive method of documentation and will not damage the site in any way. The scanner's laser is in the visible spectrum and does not affect the material it is scanning. All field work was undertaken using the Leica C10 ScanStation scanner (Figure 1, Table 1). Multiple scans were taken from different viewpoints in order to achieve maximum

coverage of the site. The scans were later stitched together using common targets to form one point cloud of the entire site.

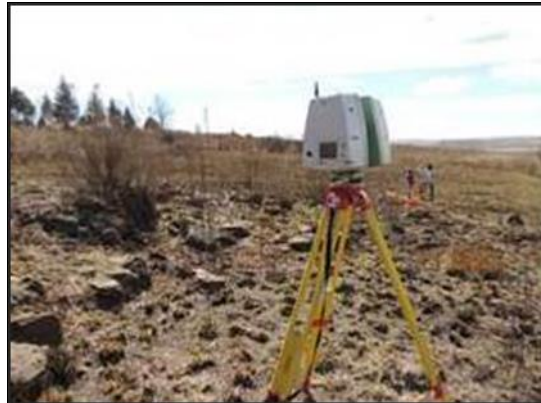


FIGURE 1 LEICA C10 SCANSTATION SCANNER

Type	Time-of-flight
Wavelength	Green: 532nm
Accuracy (position)	6mm
Accuracy (distance)	4mm
Accuracy (modelled surface)	2mm
Range	300m in ideal conditions
Scan rate	up to 50,000 points/sec
Field of view	360° horizontal, 270° vertical

TABLE 1 SPECIFICATIONS OF THE C10 SCANSTATION SCANNER

3.4. Aerial photography

Very high-resolution aerial photography was captured for the entire site. Aerial photogrammetry is the science of taking vertical aerial photographs that overlap by about 80% that are then calibrated and used to create orthophotos or orthophoto maps which are geometrically corrected and scaled. These orthophoto maps can then be used for measurements and have a coordinate system related to the image.

3.5. Virtual tour

A virtual tour is a digitally-simulated panoramic tour which is designed specifically for viewing on the internet. Using a series of panoramic images, the virtual tour provides realistic walkthroughs of the site (like Google street view) from any computer with internet access. The virtual tour allows the public to virtually access the site – without the need for an armed ranger or disruption of wildlife and without any physical impact to the site. The tour is available to view from the African Conservation Trust heritage website: <http://www.actheritage.org/makahane-virtual-tour/>

4. DESCRIPTION OF THE AREA

The KNP's approximate two million hectares lie in the low-lying savannas of north-eastern South Africa, with elevations from about 250 m to a small section over 800 m. The KNP's climate is tropical to subtropical with high mean summer temperatures and mild, generally frost-free winters. Rainfall, delivered mostly through convective thunderstorms, is concentrated between October and April. A rainfall gradient stretches from an annual mean of about 750 mm in the south-west, to 350 mm in the north, although strong inter-annual and roughly decadal cyclic variations exist, with drought considered endemic. The basic geological template comprises a western granitic half, characterized by distinctive catenas, and an eastern clayey basaltic and rhyolitic half (Figure 2), with some important smaller intrusive, sedimentary or recent sandy zones.

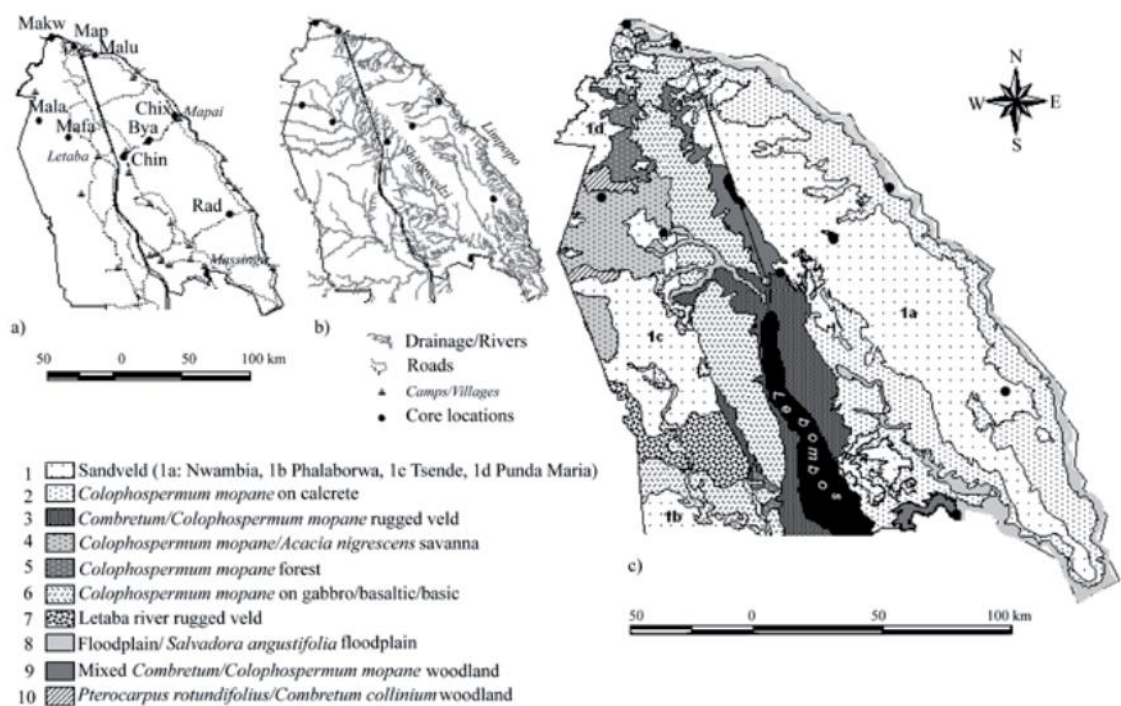


FIGURE 2 THE PHYSICAL ENVIRONMENT OF THE NORTHERN KRUGER NATIONAL PARK (TAKEN FROM EKBLOM & GILLSON 2011)

The extreme north of KNP is unique due to its diverse assemblage of rock formations. Seven major perennial or seasonal rivers cross the park, and especially the western half of the park's terrestrial landscape is heavily dissected by drainage channels on undulating land. KNP's patterns of geology, soil, fire and rainfall, and its convergence zones are regional to local factors which are emphasized in the vital attributes section below. Current land use around KNP is dominated by small-scale cropping, limited commercial farming and grazing in rural impoverished areas and communal conservation areas, while private conservation, game and cattle farming and high-value irrigated crop farming dominate other areas. The area north of

the Olifants River in Mozambique comprises the relatively recently proclaimed Limpopo National Park while the area south of the Olifants River is predominantly under hunting concessions. (Taken from the IMP 2008)

To the north and south of the park two rivers, the Limpopo and the Crocodile respectively, act as its natural boundaries. To the east the Lebombo Mountains separate it from Mozambique. Its western boundary runs parallel with this range, roughly 65 kilometers (40 mi) distant. The park varies in altitude between 200 meters (660 ft.) in the east and 840 meters (2,760 ft.) in the south-west near Berg-end-Dal. The highest point in the park is here, a hill called Khandzalive. Several rivers run through the park from west to east, including the Sabie, Olifants, Crocodile, Letaba, Luvuvhu and Limpopo Rivers.

The site is located in the north west of the Park (Figure 3). The area surrounding the site is mostly Red bush-willow and mopane veld and generally hilly and rocky. It is on one of these hills (Figure 4), near the confluence of the Luvuvhu and Mutale rivers, north of the Punda Maria Rest Camp, that the site is situated.

5. DISCUSSION

5.1. Short Background History of the Area

The Kruger National Park has a rich history of human settlement and utilization dating back to at least the earlier Stone Age. San hunter-gatherers were present, with some rock art in the south and north western parts of the Park being evidence of this. The Park also contains many sites associated with black Iron Age farming communities. By the mid 18th century farming communities in the greater Kruger National Park area lived in numerous, small-scale political units which varied in size, population and political structure. The era from the 12th century till around 1650 was characterized by active trade, first from Mapungubwe, along the Limpopo River to Mozambique and later from Thulamela.

Huffman & Hanish (1986) states that Zimbabwe Culture sites consisting of stonewalled ruins have been recorded over a large part of southern Africa, especially the Limpopo Province. Gilson & Ekblom (2009) mentions that the excavations at Thulamela confirmed that the central Limpopo valley was inhabited during the LIA, notwithstanding regular droughts. As in other contemporary sites in the area, cattle-economy was a significant social and political resource as cattle were utilized for bride wealth. Yet, the bone assemblages of Thulamela have a greater representation of wild animals, particularly fish, than other centers in the region (Plug 2000). This may suggest that though the Limpopo valley could support a considerable population during the LIA, the drier climate in combination with the presence of tsetse fly did not favor the maintenance of large herds of cattle. The cultivation of crops was important. Indeed, when reporting on the many fields of maize on the alluvial plains of the Limpopo, the British explorer Elton, who travelled the Pafuri area in the 1870s, stated that maize was produced above requirements and that it was traded with the elephant hunters and other communities (Elton 1873).

Though Elton in the 1870s did not observe cattle near the settlements, it is likely that cattle were herded in the larger area around them (see discussion in Manyanga 2006). Rinderpest, a disease which in 1895–1897 eliminated a sizeable amount of both wild and domesticated cattle

in the whole region of southern Africa (Newitt 1995) would have influenced populations in the region severely. This necessitated that communities became dependent on migrant labour for acquiring bride wealth (Gillson & Ekblom 2009).

These settlements were the political centers of Shona-speaking leaders whose leadership was based on divine kingship. From an archaeological perspective Huffman (2007) refers to this site and its association with Venda origins. Much of the information about the origins of the Venda was gathered from oral traditions (van Warmelo 1932, Stayart, 1931 & Ralushai, 1977). Groups of people moved south of the Limpopo, from modern day Zimbabwe, and found the Ngoni settlements. These Zimbabwe type stonewalled settlements were each part of a chiefdom and ruled by a chief. The Nyai branch of the Lembethu ruled from Makahane (Eloff and de Waal, 1965) and later Thulamela (Kusel, 1992).

This is acknowledged by other Venda chiefdoms today, giving validity to the oral histories. The Nyai chiefdom was a separate and independent chiefdom, like all Venda chiefdoms.

In 1895, Jakob Louis van Week introduced in the Volksraad of the old South African Republic, a motion to create the game reserve. The area proposed extended from the Olifant River until the Sabie River in the north. That motion, introduced together with another Volksraad member by the name of R. K. Loveday, and accepted for discussion in September 1895 by a majority of one vote, resulted in the proclamation by Paul Kruger president of the Transvaal Republic, on 26 March 1898, of a "Government Wildlife Park." This park would in the future be known as the Sabie Game Reserve.

The park was initially created to control hunting and protect the diminished number of animals in the park.

James Stevenson Hamilton became the first warden of the reserve in 1902. The reserve was located in the southern one-third of the modern park. Shingwedzi Reserve, named after the Shingwedzi River and now in northern Kruger National Park, was proclaimed in 1903. During the following decades all the native tribes were removed from the reserve and during the 1960s the last were removed at Makuleke in the Pafuri triangle. In 1926, Sabie Game Reserve, the adjacent Shingwedzi Game Reserve, and farms were combined to create Kruger National Park.

During 1923, the first large groups of tourists started visiting the Sabie Game Reserve, but only as part of the South African Railways' popular "Round in Nine" tours. The tourist trains used the Selati railway line between Komatipoort on the Mozambican border and Tzaneen in Limpopo Province. The tour included an overnight stop at Sabie Bridge (now Skukuza) and a short walk, escorted by armed rangers, into the bush. It soon became a highlight of the tour and it gave valuable support for the campaign to proclaim the Sabie Game Reserve as a national park (Pienaar, U. de V., *Neem uit die Verlede*, Sigma Pers, 1990).

After the proclamation of the Kruger National Park in 1926, the first three tourist cars entered the park in 1927, jumping to 180 cars in 1928 and 850 cars in 1929 (House of Assembly Debates, cols 4366-81, 31 May 1926).

5.2. The Site

The site was first recorded by Don Lowe, then resident District Ranger for the Punda Maria Area. Its first (and only formal) archaeological investigation was by Eloff & De Vaal 1963 (Eloff & de Waal 1965). Makahane is situated on the northern boundary of the Park near the confluence of the Luvuvhu and Mutale rivers, north of the Punda Maria Rest Camp. The core of the settlement is situated on the top of the east-west hill (Figures 5-8) and is covered in extensive residential deposit. The commoner area is on the eastern and western slopes of this large hill with the muzinda of the chief (Figure 9) situated on the hilltop. It is estimated that the site was occupied from the 17th, 18th and early 19th centuries by the Lembethu tribe (Eloff, 1966). Their most infamous chief, Makahane, was known to be particularly cruel. Oral history tells us that he, for instance, executed those who infringed against him by lowering him down the cliffs at the west of the hill (Figure 7). Halfway down these cliffs was the nest of a large bird. The idea was for the person lowered to fetch a chick from the nest, be hoisted up and to present it to Makahane. If this was achieved the offender would be set free, if not the rope would be cut, and the person would fall to his death.

Another form of punishment had to do with the drying of cow hides. Eventually, not even his own father could stand his brutality and sent Makahane's brother, Nelombe, to kill him. Nelombe then took over the rule of the tribe. Makahane is said to have been buried within the settlement.

The site is still revered by nearby communities with respect and a certain amount of fear and the remains of its stone walls is reminiscent of these at other stonewalled settlements in Zimbabwe and Limpopo, including that of Thulamela (Figures 10 & 11).

The site, as Eloff and de Waal (1965) stated had (and still has) the potential to provide significant information with regards to the prehistory of the area. Its significance lays in its association with known group of people and especially its association with a known person.

The site consists of various walls constructed with local, flat sandstone, without any form of cement. These flat stones were stacked in a double row and the space between these rows infilled with smaller stones. The two rows of walling taper out at the top resulting in a broader base and narrower top. This resulted in a sturdier construction. No evidence of foundations was found. The overall shape of the stonewalled portion of the site is that of an oval. The average length of the stonewalled area is approximately 55 m and its width are 30m. It consists of an "outer wall" and internal walling that separates the internal space into separate spaces. The center of the settlement spans the top of a hill where evidence of a large residential deposit can still be seen. The chief's enclosure (muzinda) was built on top of a knoll at the eastern end (Huffman & Hamish 1986). It is in this internal space that the suggested grave of Makahane can be found.

The front of this area faces west, while long U-shaped walls form the back. This back area is in an equivalent position to the Eastern Enclosure at Great Zimbabwe, where several soapstone birds were found. In Shona cosmology the east is associated with sacred activities, and this east back area can be identified as the site of rituals involving royal ancestors. According to Shona custom, areas such as these should contain at least one hut for the chief's drums and other sacred objects, a second hut for brewing ritual beer, and space for the congregation.

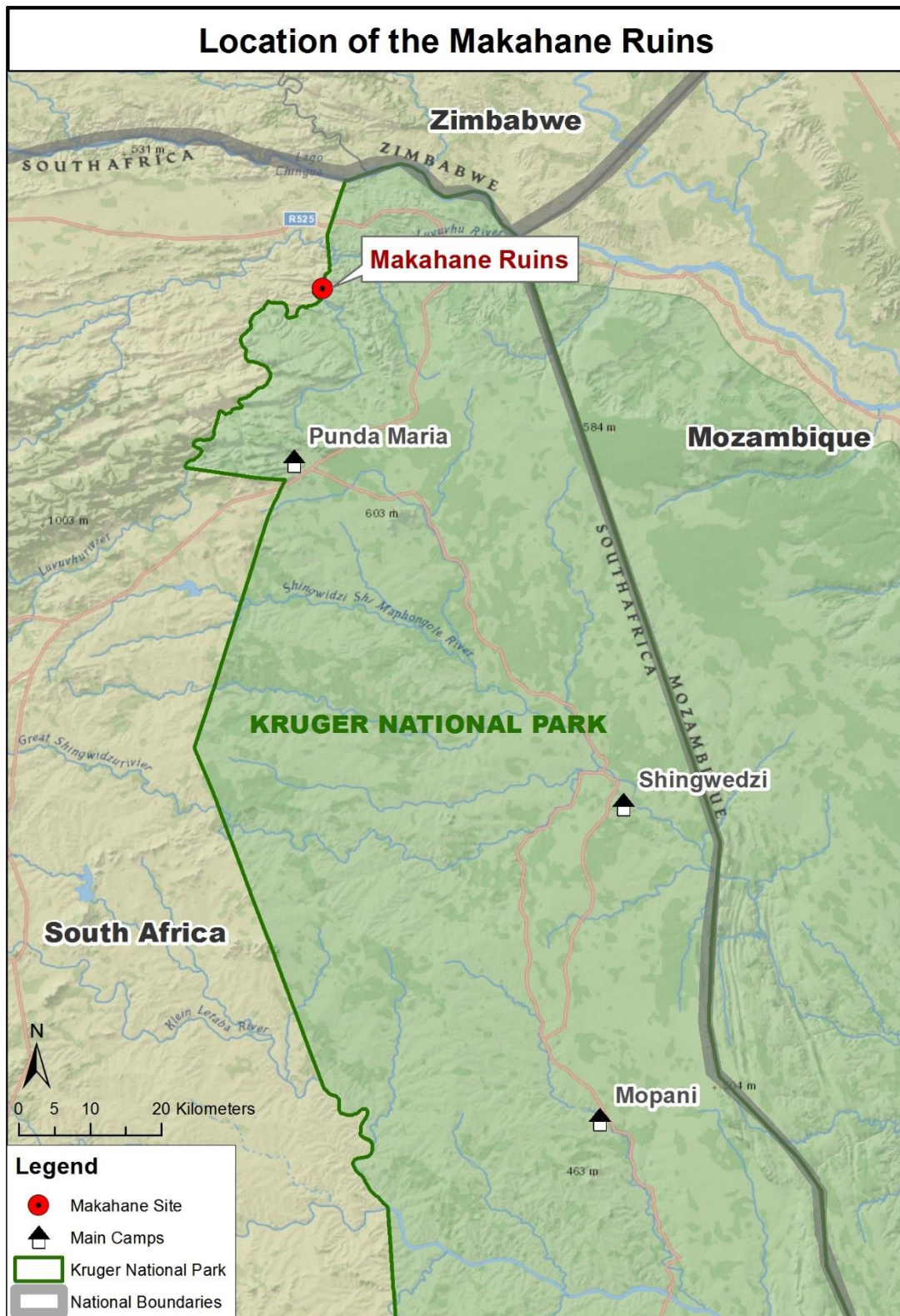


FIGURE 3: GENERAL LOCATION OF THE SITE

In this case, the ritual enclosure is over 400m, which is as large as many level-3 muzinda. Similar sized ritual areas were recorded at most of the other level-4 settlements. The organisation of the front of Makahane followed the typical Zimbabwe patterns: a stone stairway led up to the audience chamber in the centre; the messenger's hut to the right overlooked the stairway and court below; the waiting area was to the left - incorporating in this case a prominent seat for the chief; and access to the senior sister was further to the left through the doorway bearing a pair of vertical grooves (Huffman & Hamish 1986). Decorated pottery is still visible on the surface. The walls were built on a slope, resulting on the exterior of many walls being longer than its corresponding interior.



FIGURE 4 ORTHOPHOTO OF MAKAHANE HILL

A large open area with signs of habitation (Figures 5-8) is found to the west, below the stonewalling. There is no stonewalling in this area, but signs of occupation included glass beads, pot sherds and stones with man-made depressions (Eloff & de Waal, 1966).

The 1963 excavations focused on a section within the stone walled area and was accompanied by a survey of the general area and oral history recording with descendants of the last inhabitants of the site.

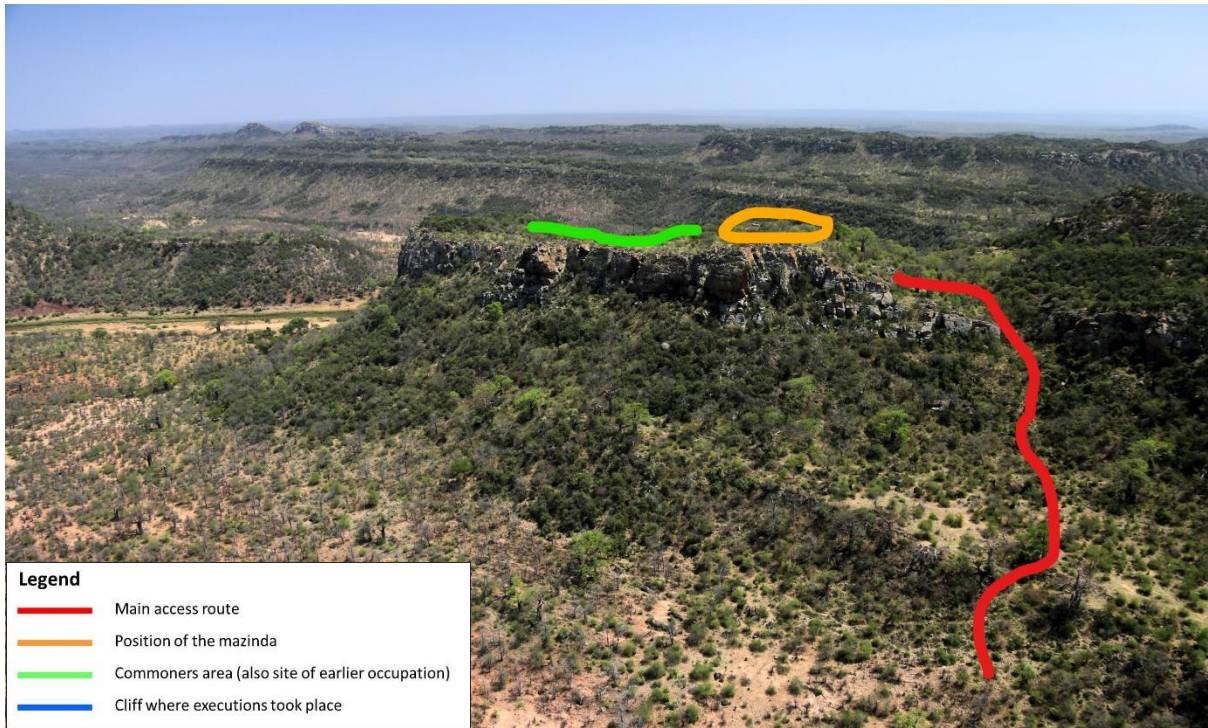


FIGURE 5 VIEW FROM THE SOUTH TOWARDS MAKAHANE.

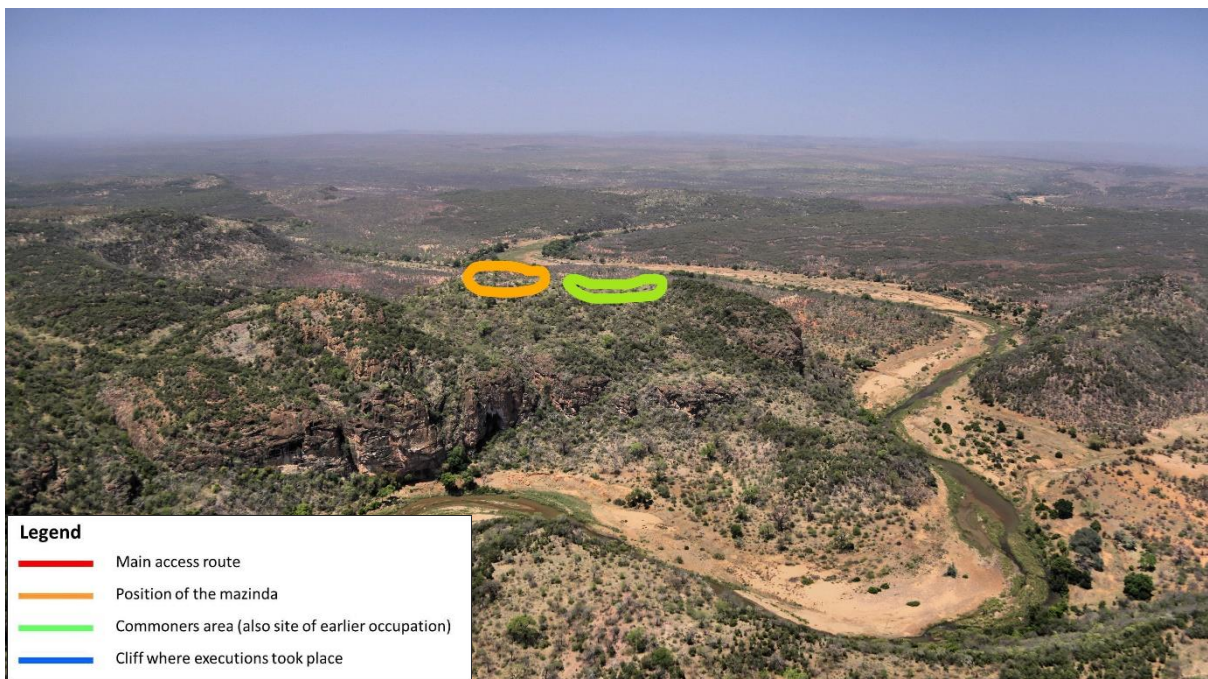


FIGURE 6 VIEW OF THE HILL FROM THE NORTH.

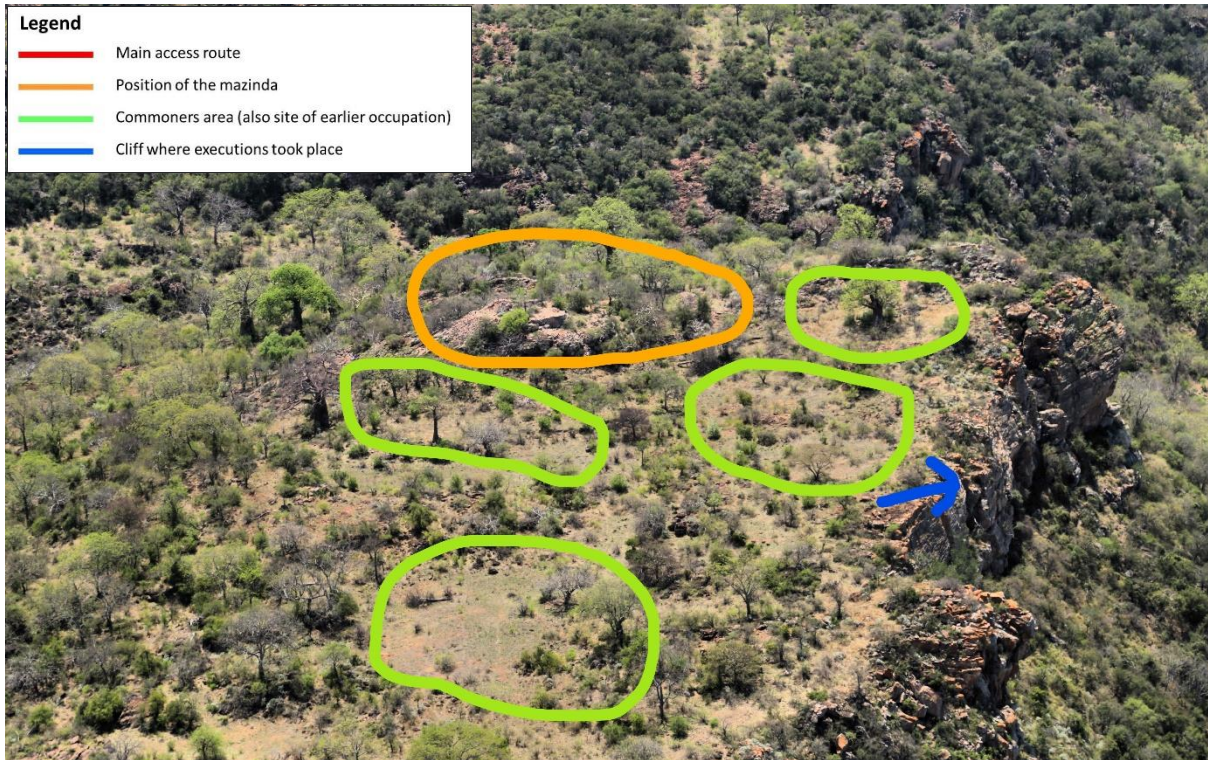


FIGURE 7 CLOSEUP AERIAL VIEW.

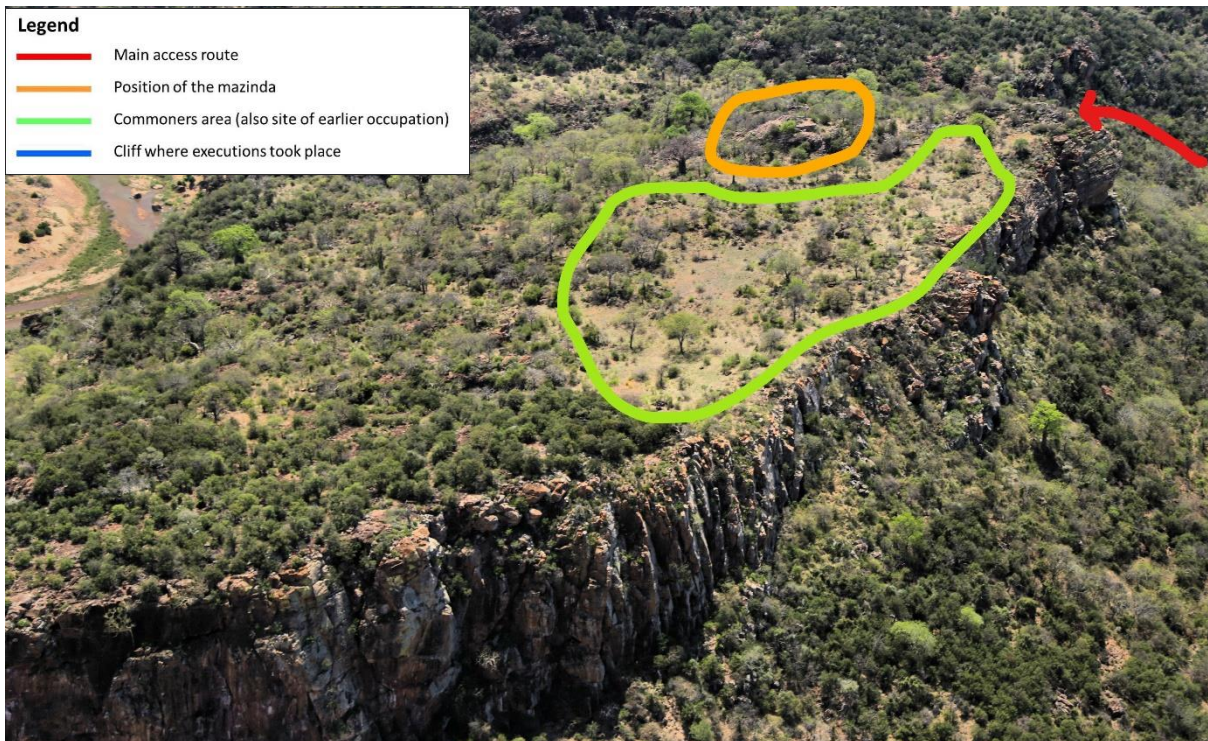


FIGURE 8 COMPLETE AERIAL VIEW OF THE HILL. RED INDICATES THE MUZINDA, GREEN THE COMMONERS AREA AND RED THE MAIN ACCESS ROUTE

Figure 12

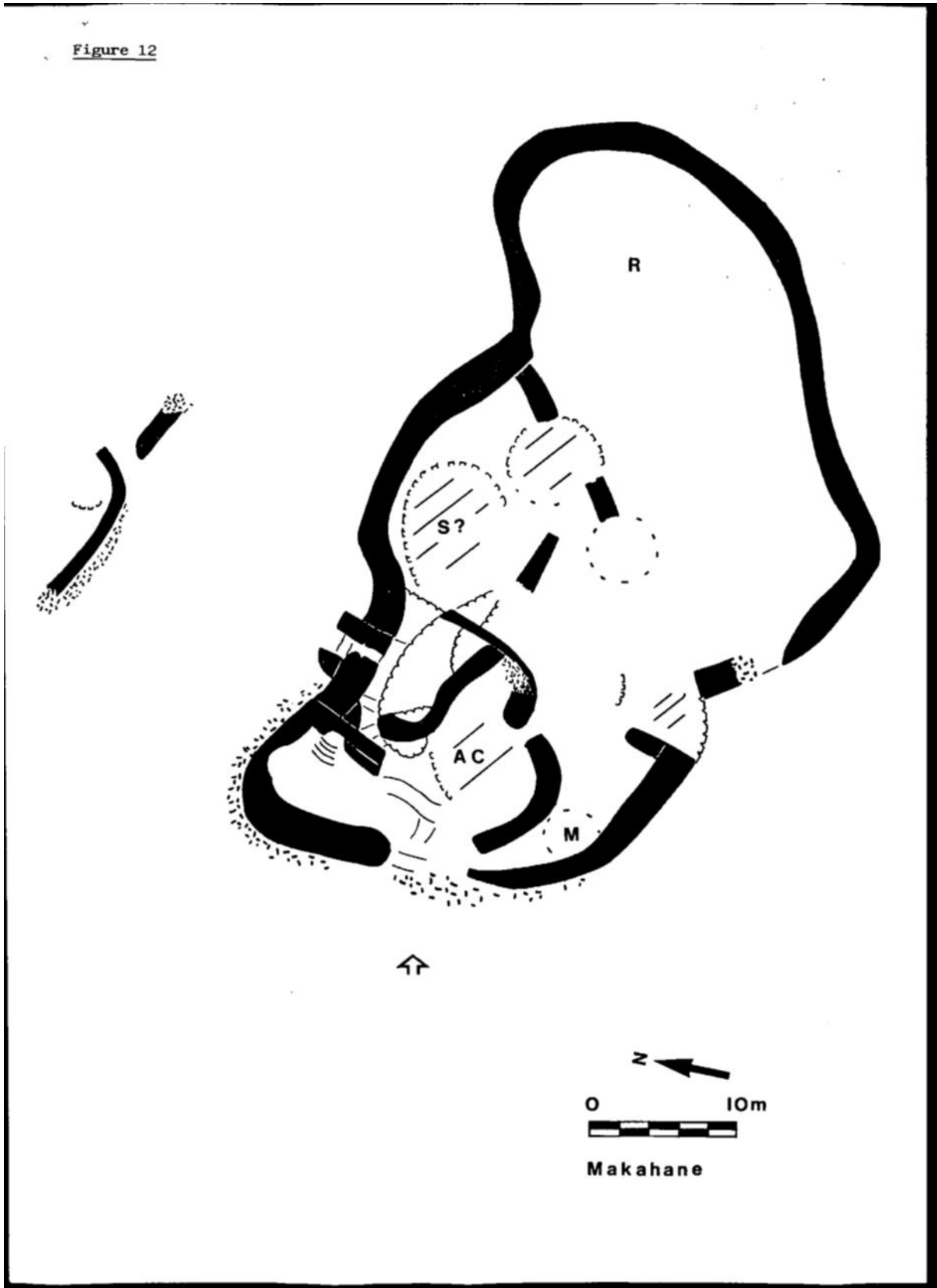


FIGURE 9 DRAWING OF THE SITE LAYOUT. TAKEN FROM HUFFMAN & HAMISH (1986).

5.3. Previous archaeological research in the Kruger National Park

Parts of the Kruger National Park have been relatively well surveyed by archaeologists. The first formal archeological research in the KNP was instituted in 1963 when Eloff and de Waal excavated at Makahane (1965) and in 1973 the National Parks Board of Trustees allocated a research project to the University of Pretoria with Prof. Eloff as project leader (Verhoef 1986). During this project the Masorini Iron Age site near Phalaborwa was investigated, with supplementary excavations at nearby Shimbuku and Vhudogwa (Eloff 1976). By 1977 a survey of the southern banks of the Letaba was underway. From 1977 till 1983 large parts of the KNP were surveyed and hundreds of sites identified (Eloff 1977, 1981, 1982, 1983 & Meyer 1983, 1985).

The following types of sites have been identified by those mentioned above and others:

1. Stone Age sites

- Pafuri Site
- Stolznek Site
- Crocodile River Valley
- Pumbe Pan
- Punda Maria area
- Olifants Gorge area
- Skukuza area

2. Rock art

- Malalane, Stolznek, Skukuza hills (highest concentration)
- Upper Timbavati River area
- Lower Bangu River area
- Punda-Pafuri area

3. Iron Age sites

- Pafuri
- Makahane
- Lebombo
- Shilowa
- Masorini
- Nsikazi
- Mahula
- Phalaborwa (smelting)
- Stolznek (smelting)
- Shikumbu (smelting)
- Vhudogwa (smelting)
- Pretorius Kop
- Mopani
- Thulamela (Figures 12 & 13)
- Letaba River
- Thula Mila (Figure 14)
- Dzindzwi (Figure 15)

4. Historical sites

- Steinecker Horse Sites
- Transport routes

5. Sites of symbolism and sacredness

6. Possible paleontological sites

7. Sites of geological value

The following is a list of publications of archaeological and associated research in the KNP (<https://www.sanparks.org/conservation/people/social/research/bibliography.php>)

- Proklamasie van die Sabie Wildtuin, 26 Maart 1898 copy of the original proclamation signed by Pres Paul Kruger in 1898 Koedoe 4 – 1961 Page 1 - 3
- BIRKHOLTZ, POLKE.D. 1997. Die Argeologie van Pretoriuskop. University of Pretoria.
- CARRUTHERS, J. 1993. “Police boys” and poachers: Africans, wildlife protection and national Parks, the Transvaal 1902 to 1950 Koedoe 36/2 – 1993 pages 11 to 22
- GIBBON, R. 2003. Investigation into the Earlier Stone Age of the Northern Kruger National Park.
- JORDEN, T.J.W. 1961. Verslag oor die ondersoek in verband met Ou Aambeeld wat vermoedelik tot die Van Rensburg Trek behoort het. Koedoe no 4 – 1961 pages 45 – 53
- JOUBERT, S.C.J. 1986. The Kruger National Park – An Introduction. Koedoe 29 pages 1 to 12.
- KUSEL, M. 1992. A preliminary report on settlement layout and gold melting at Thula Mela, a late Iron Age site in the Kruger National Park. Koedoe 35/1 – 1992 pages 55 to 64
- LOMBARD, B.V. 1969. Herkoms van die naam Pretoriuskop. Koedoe – no 12 – 1969 pages 53 to 56
- MESKELL, L. 2005. Archeological Ethnography: Conversations around Kruger National Park. Archaeologies: Journal of the World Archaeology Congress 1:1,2005.
- MEYER, A. & VERHOEF, J. 1999. Archaeology of the Kruger National Park: Cultural Heritage Mapping, Management and Education. University of Pretoria and SANParks.
- MEYER, A. 1986. n Kultuurhistoriese intepretasie van die Ystertydperk in die Nasionale Krugerwildtien University of Pretoria.
- NEMAHENI, T. I., VAN HEERDEN, M. & VAN SCHALKWYK, J.A. 2002. A Cultural Heritage Resource Management Plan for Thulamela Heritage Site. University of Pretoria.
- PIENAAR, U. DE V. 1990. Neem uit die verlede. South African National Parks.
- PLUG, I Hunters and Herders: An Archeological Study in the Kruger National Park
- PLUG, I. 1989 Notes on distribution and relative abundance of some animal species, and on climate in the Kruger National Park during prehistoric times. Koedoe 32/1 pg 101 – 119
- PLUG, I. 1991. Fish and other faunal remains from a Late Iron Age site on the Letaba River, Kruger National Park. Koedoe 34/1 – 1991 pages 1 to 6
- PUNT, W.H.J. 1962. n Beknopte oorsig van die Historiese Navorsing in die Nasionale Krugerwildtuin. Koedoe no 5 pages 123 to 127
- VERHOEF, J Die Oprigting en Ingebruikstelling van die Msorini Terreinmuseum in die Nasionale Krugerwildtuin
- VERHOEF, J. 1986. Notes on Archaeology and prehistoric mining in the Kruger National Park Koedoe 29 – 1986 pages 149 to 156
- VON VOLLENHOVEN, A.C. A Historical and Archeological investigation of the Cultural remains of the different outposts of the Steinacker’s Horse Military Unit in the KNP.
- VON VOLLENHOVEN, A., PELSER, A.J. 2004 Steinacker’s Horse: It’s role during the Anglo Boer War and in the establishment of the Kruger National Park. South African Journal of Cultural History Vol.18 No 2, November 2004

- VON VOLLENHOVEN, A.C., PELSER, A.J. & TEICHERT, F.E. A Historical Archaeological Investigation of the Northernmost Outpost of Steinacker's Horse, Letaba District, Kruger National Park II
- VON VOLLENHOVEN, A.C., PELSER, A.J. & TEICHERT, F.E. Historical and Archaeological investigation of the Northern outpost of Steinacker's Horse near Letaba Restcamp
- VON VOLLENHOVEN, A.C., PELSER, A.J. & TEICHERT, F.E. A Survey of the Remains of some of the outposts of the Steinacker's Horse Military Unit in the Kruger National Park
- VON VOLLENHOVEN, A.C., PELSER, A.J. & TEICHERT, F.E. Steinacker's Horse Historical Archaeological Research Project
- VON VOLLENHOVEN, A.C., PELSER, A.J. & TIECHERT, F.E. Survey Of Masorini and Surrounding Koppies
- VAN VOLLENHOVEN, AC, PELSER AJ, VAN DEN BOS, JW A historical-archaeological investigation of an Anglo-Boer War British outpost in the Kruger National Park Koedoe 41/2 – 1998 Pages 113 to 120

Unpublished reports includes the rock art surveys by English and de Roshner and the current work being undertaken by Anton Pelsler at Mahula.

The next section will discuss the results of the 2017 fieldwork assessment.

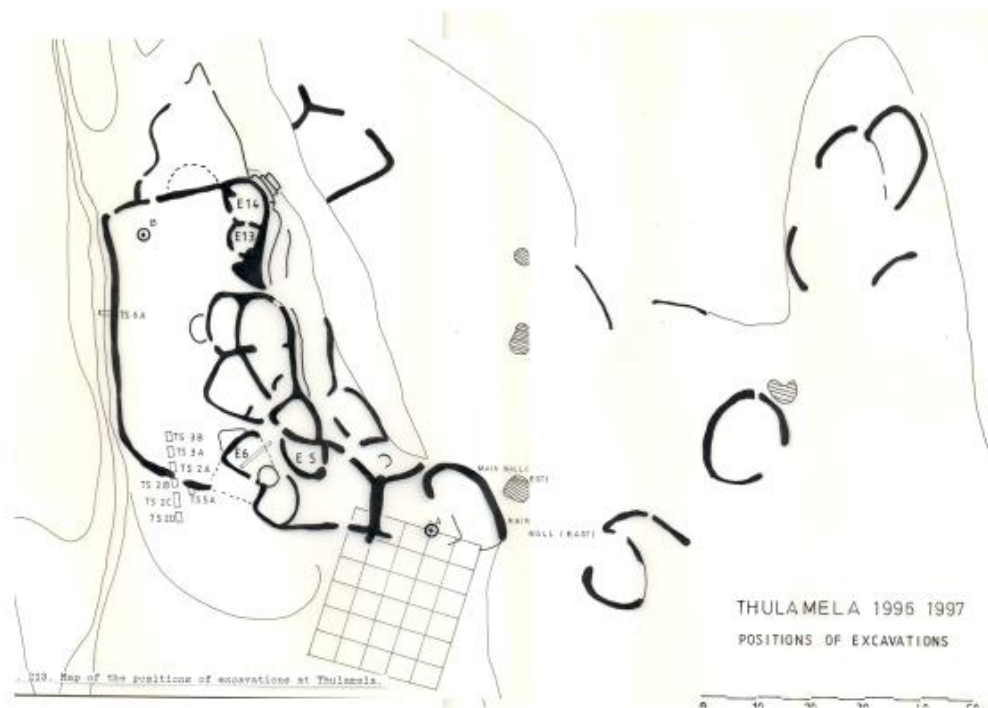


FIGURE 10 DRAWING OF SITE LAYOUT OF THULAMELA (DONE BY SIDNEY MILLER)



FIGURE 11 THE RECONSTRUCTED WALLS AT THULAMELA (PHOTO BY SIDNEY MILLER)



FIGURE 12 THE MALE ENCLOSURE AT THULAMELA, SIMILAR TO THE MALE ENCLOSURE (MUZINDA) AT MAKAHANE (PHOTO BY SIDNEY MILLER)



FIGURE 13 DRAWING BY SIDNEY MILLER OF THE SUGGESTED RECONSTRUCTION OF THUMELA.

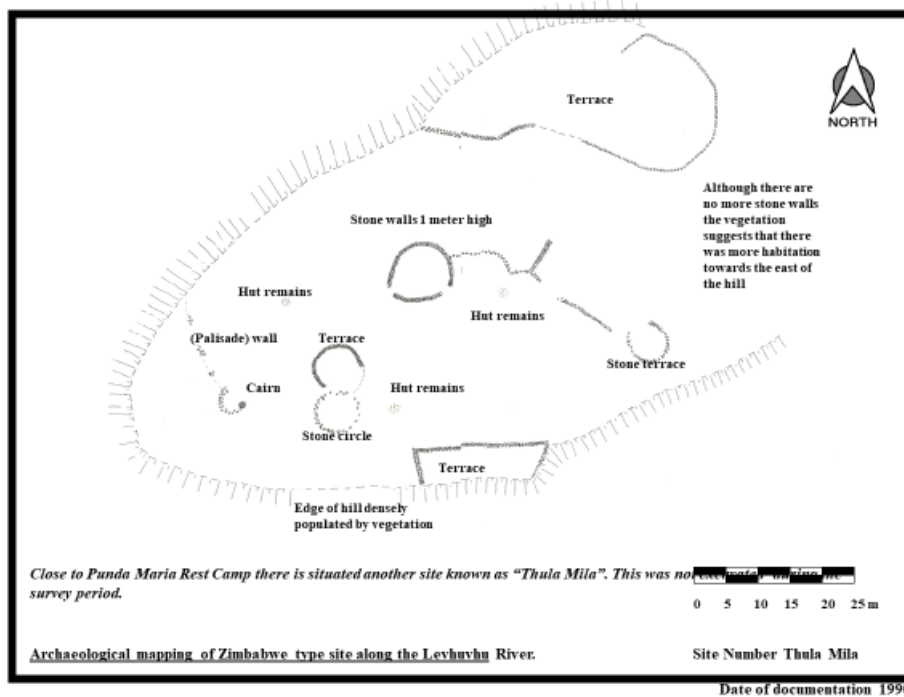


FIGURE 14 THE SITE DRAWING OF THE "THULA MILA" SITE NEAR PUNDA MARIA REST CAMP (DRAWN BY SIDNEY MILLER)

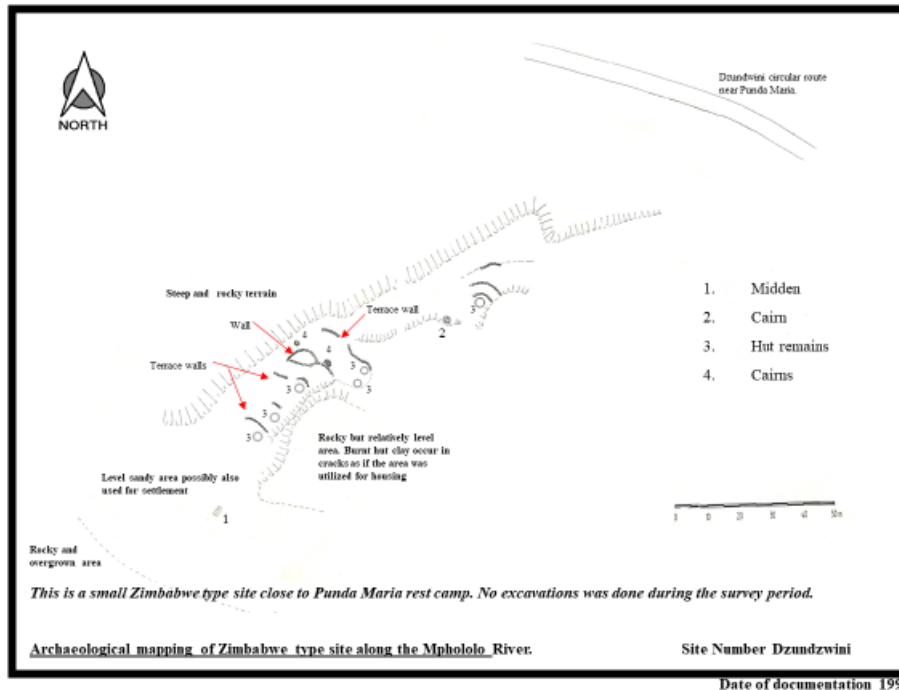


FIGURE 15 SITE DRAWING OF THE DZUNDZWINI SITE NEAR PUNDA MARIA REST CAMP (DRAWN BY SIDNEY MILLER)

5.4. Results of the 2017 Fieldwork

1. 3D laser scanning

The site was documented using a terrestrial 3D scanner (Figures 16 & 17). The 3D scanning of the core of the site was successfully completed. A total of 31 individual scans were taken (Figures 18-20) around the site with the final point cloud comprising of 203 million measured points. The stone walling was captured with an accuracy of 2-5mm, offering highly detailed information about the current state of the site and providing baseline data to monitor change. The scanning process also allowed for an accurate CAD drawing to be created from the scanned data (Figure 21), along with a comparison between this drawing and that of Huffman & Hamish (1986). It is clear from this comparison that the CAD drawing based on the scanned data produced a slightly different, but more accurate layout. An accurate cross section of the site (Figures 23 & 24) was also produced.



FIGURE 16 SCANNING IN PROGRESS



FIGURE 17 SCANNING IN PROGRESS, CONTINUED



FIGURE 18 SCANNED IMAGE 1



FIGURE 19 SCANNED IMAGE 2



FIGURE 20 COMBINED SCANNED IMAGE



FIGURE 21 CAD DRAWING CREATED FROM THE SCANNED DATA



FIGURE 22 CAD DRAWING CREATED FROM THE SCANNED DATA IN RED, OVERLAID ON FIGURE 9

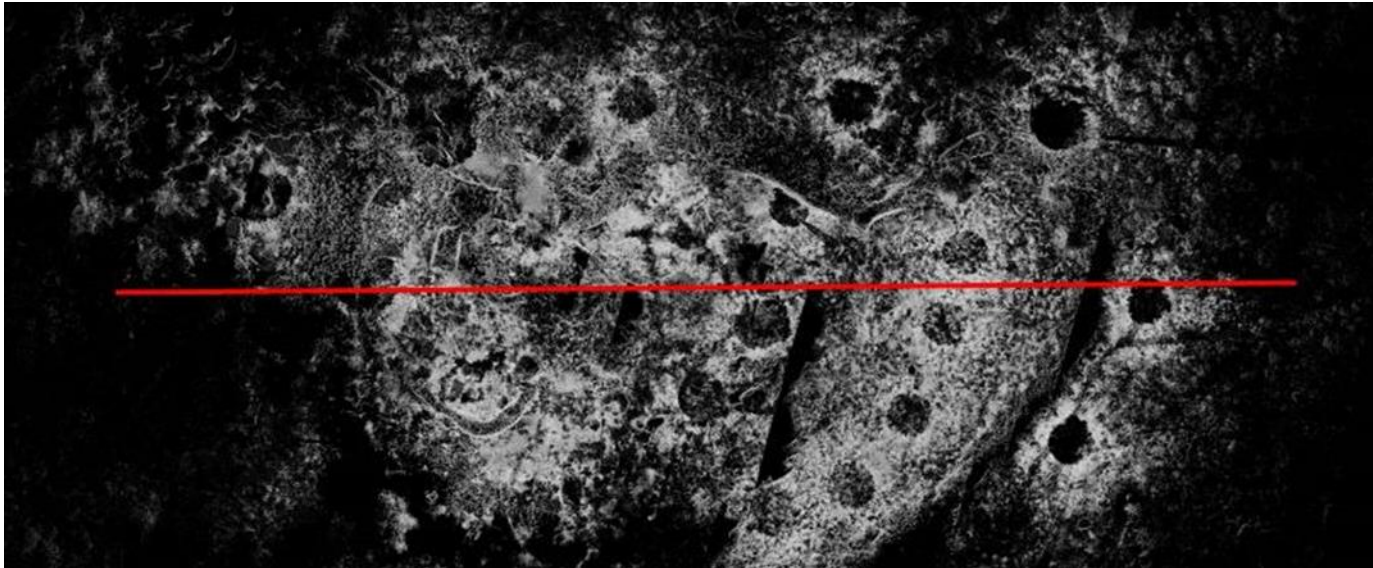


FIGURE 23 THE RED LINE INDICATES THE AREA OF WHICH A CROSS SECTION WAS CREATED FOR

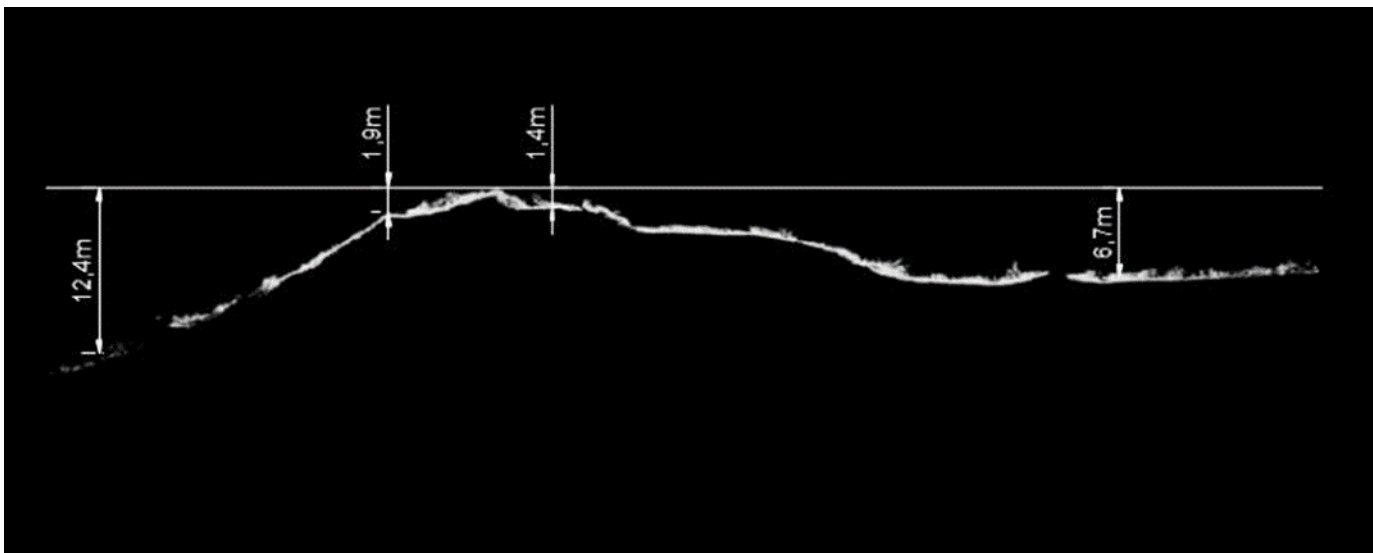


FIGURE 24 THE CROSS SECTION OF THE SITE, RELATED TO FIGURE 22.

2. Aerial photography

A fly through aerial video of the entire hill has also been produced. In the case of Makahane, 990 aerial images were taken from approximately 1200 feet above ground level with a Ground Sampling Distance of 4.16cm to create the orthophoto map. Figure 24 shows the flight path used during the aerial photography.

The following attachments supplement this report:

- Makahane fly through 1080p (video created from the aerial photography)
- Makahane report (technical report of the aerial photography)

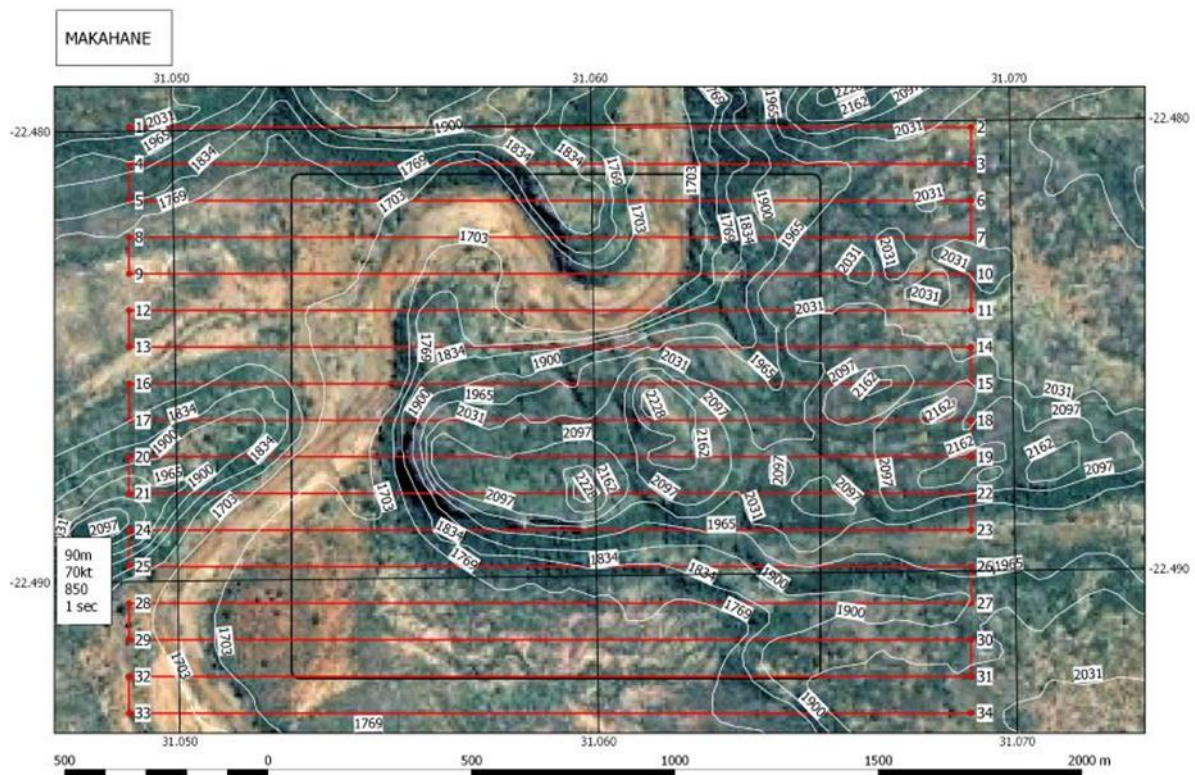


FIGURE 24 THE FLIGHT PATTERN OF THE AERIAL PHOTOGRAPHY



FIGURE 25 THE GEO REFERENCED IMAGERY IN GOOGLE MAPS.

3. Virtual tour

A virtual tour, combining a selection of 360° panorama images of the site, was created. It is available from the African Conservation Trust heritage website at: <http://www.actheritage.org/makahane-virtual-tour/>

4. Assess the site's significance

Makahane had no previous designation as a National Monument under previous legislation and only general protection under current legislation. (National Heritage Resources Act No 5/1999). This Act requires all sites be assessed, as such this grading exercise.

4.1 Aesthetic value

The site itself has aesthetic value and has not been subjected to vandalism in the past. No controlled rehabilitation has taken place. Its setting is aesthetically pleasing as it is located in a picturesque part of the KNP, near a gorge with lush indigenous vegetation.

4.2 Social value

The site is of medium social value to the local communities. It is however, a well-known site and of value to the archaeological community.

4.3 Historical value

The site has an occupation dating back to the Late Iron Age, and possibly earlier. An historical importance/association to a group or persons can be assigned to this site, it is also important to note that it was the first archaeological site in the KNP to have been formally excavated.

4.4 Scientific value

The site has not been excavated for over 50 years and there is much scientific potential for new, modern excavation to provide more detailed information of the occupation of the site.

4.5 Architectural value

The Iron Age stone walling is of some significance. Better examples exist at Thulamela, but these have been reconstructed.

4.6 Linguistic value

N/A.

4.7 Technological value

N/A

4.8 Condition

Limited collapse of the stone walling has taken place, but the site is overall in a very good condition.

4.9 Rarity

The site forms part of a collection of stone walled sites in the north of the KNP. It has, however, one of the most extensive stone wallings other than Thulamela.

VALUE	HIGH	MEDIUM	LOW	NCW ¹
Aesthetic			X	
Social		X		
Historical		X		
Scientific		X		
Architectural			X	
Linguistic				N/A
Technological			X	
Condition		X		
Rarity		X		

The potential of further scientific research must be stressed. Linked with other stonewalled sites in the north of the KNP, it can provide a better understanding of human settlement in the prehistory of the Park.

A **Grade IIIa** grading is suggested.

5. Provide a set of management recommendations related to the site

In 1997, KNP followed a public process of determining a desired state, the three focus areas then being biodiversity, human benefits and wilderness. At the first revision, the three important mainstays have remained but cultural heritage and later constituency building were added to the mission (IMP 2008).

According to the Integrated Management Plan for the Park (2008) a major theme “in the desired state include the mapping, auditing and the development of preservation, conservation and management plans of cultural heritage landscapes and resources (notably Thulamela and Masorini sites, and the wide-spread San Rock Art) within the thematic domain of People and Conservation.”

The IMP (2008) also mentions that “the KNP has a draft Cultural Heritage Management Programme (Lower Level Plan 7) and the desired state for KNP includes maintenance of cultural heritage assets, notably Thulamela and Masorini sites, and the widespread San Rock Art. All actions are advised by SANParks policy on cultural resource management (SANParks 2006). A heritage inventory initiative, embracing all aspects of cultural heritage, has been identified as an essential priority within the next five years in KNP. In addition, KNP has some significant heritage resources within its boundaries requiring further research. Other objectives for the KNP include development and implementation of a Heritage Management Plan with appropriate Site Management Plans for those sites that have been identified for educational, research and/or tourism purposes.”

Taking the above in to account the following recommendations are made:

a. Further concerted and detailed cultural resources surveys of the area surrounding Makahane in order to cover those areas not yet visited during previous studies. When Makahane was excavated, a limited amount of archaeological deposits were exposed. The information available is not sufficient to make final conclusions concerning the site. There is more information to be gained.

b. The drafting and implementation of a detailed Cultural Resources Management Plan for the site, based on current information, that will address aspects such preservation/conservation and the sustainable utilization of the site cultural heritage resources of the site through further research and eco-tourism development.

A Cultural Resource Management Plan is an operational guide for managers at all levels. This plan is often defined as administrative direction or as the control of the elements that make up the physical and social environment of a site, its physical conditions, land use, human visitors and interpretation. Management of a heritage site might be aimed at preservation, or if necessary at minimizing damage or destruction.

The aims of such a plan would be:

- Detection and identification of previously unknown cultural resources and assessment of current cultural resources, to determine whether they are significant
- Planning the most appropriate long-term use of cultural resources and assessment of the risks to cultural resources.
- Protecting significant heritage resources for the use or enjoyment of present and future generations.
- Making recommendations as to how to manage, develop or protect those resources

c. Design of some form of interpretation to be erected somewhere in the Punda Maria Rest Camp, this might include a small museum with artefacts from future excavations. This would assist in promoting the northern area as part of a cultural destination, supplementing the cultural heritage facilities at the Punda Maria Gate, Thulamela site, Pafuri Picnic Spot and the new Border Camp. The development of a travelling exhibition of the Thulamela environment for the local communities and beyond could also be considered.

d. A quarterly monitoring visit by a qualified archaeologist.

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