
ARCHAEOLOGICAL SCOPING STUDY

*ESTABLISHMENT OF AN AMMUNITION DISPOSAL PLANT,
SINCLAIR'S DAM 133,
DE AAR, NORTHERN CAPE, SOUTH AFRICA*

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1) TERMS OF REFERENCE

The purpose of the establishment of an Ammunition Disposal Plant (ADP) is to:

1. Address the issue of obsolete and useless ammunition, a current challenge to all world forces. South Africa has large stocks of ammunition which are becoming obsolete and as a result of the ageing process is becoming a major safety concern;
2. Address management and responsibility concerns related to the misuse of ammunition; and
3. Devise an industrial and environmentally sustainable demilitarization process: Dumping and open burning / detonation of ammunition and explosives are, for environmental reasons, forbidden in most countries including South Africa.

A state of the art ADP, incorporating International environmental considerations and legislative requirements has been developed for the safe disposal of ammunition. It is envisaged that the proposed South African ADP will be constructed, complying with established internationally accepted standards, but also with developmental needs of South Africa, including cost efficiency, job creation, poverty alleviation and black economic participation through part ownership and operation of the plant.

The ADP will directly address the existing large amount of surplus ammunition for demilitarization in South Africa whilst exploring opportunities to market its services to other sub-Saharan African countries with a focus on the neighboring Southern African Development Countries (SADC) region.

A major emphasis of the project, from design and construction to daily management of the plant, will be on the transfer of skill and technology from Europe to South Africa.

1.1) *ADP DEVELOPMENT LOCATION & IMPACT*

The DoD has identified the need to establish a National ADP, with the most suitable locality identified at their De Aar Ammunition Depot in the Northern Cape, being centrally sited in South Africa. The Ammunition Depot is established on the municipally owned, approximate 4,580ha property Sinclair's Dam 133, located more or less 1.7km west of De Aar in the Hay District of the Northern Cape [1:50;000 map reference 3023DB].

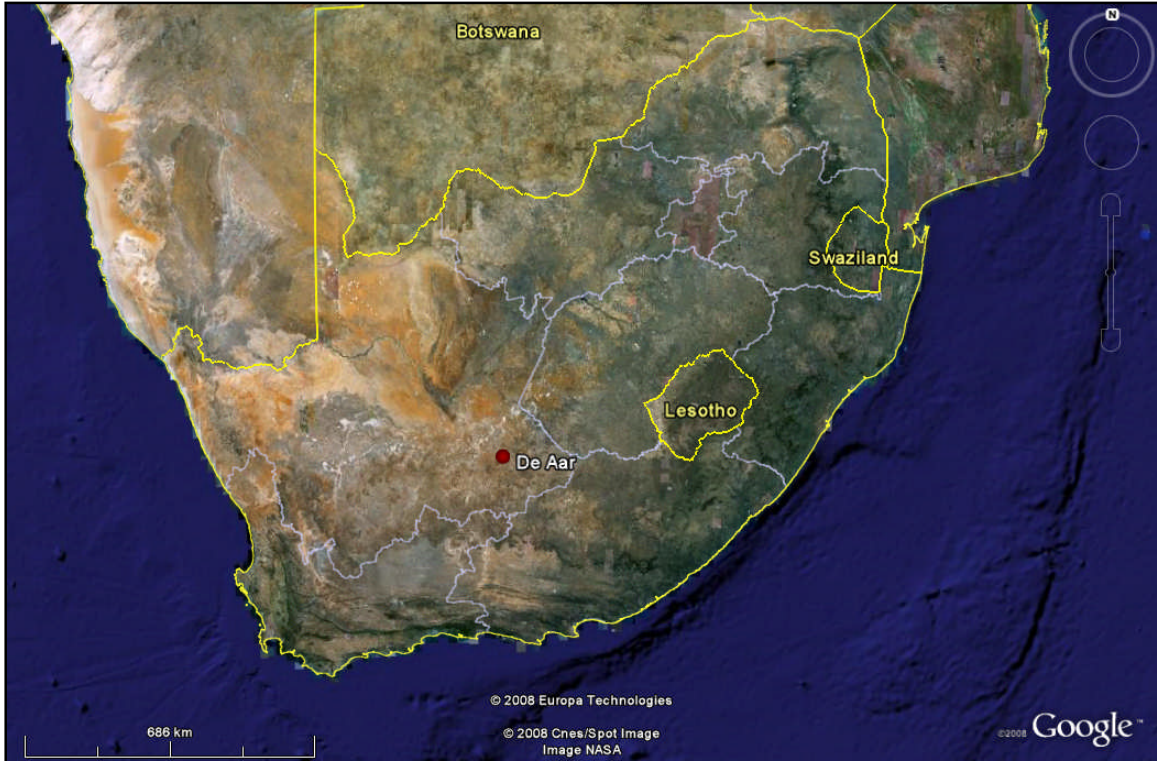


Figure 1: De Aar, Northern Cape, South Africa

The ADP factory site will comprise of a 600x600m area in surface extent, prioritized in close proximity to existing infrastructure at the Ammunition Depot. Three site localities are being considered, namely:

1. Site 1 (S30°39'04.5"; E23°55'58.3");
2. Site 2 (S30°38'32.6"; E23°57'18.3"); and
3. Site 3 (S30°39'15.1"; E23°57'45.0").

In addition to the ADP factory site the development will entail additional surface areas to be impacted on including gravel and sand quarries and at least one waste disposal site. The construction campsite, to be used during the construction phase of the project, may / may not be located at the ADP factory site itself. Post construction staff accommodation in De Aar, rather than on Sinclair's Dam 133, is at present considered. Associated linear development may well include additional roads, railway, power and pipelines.

Development impact will be localized; resulting in the loss of all surface heritage sites / features that may be present in areas of impact.



Figure 2: The 3 proposed ADP sites on Sinclair’s Dam 133, De Aar, Northern Cape

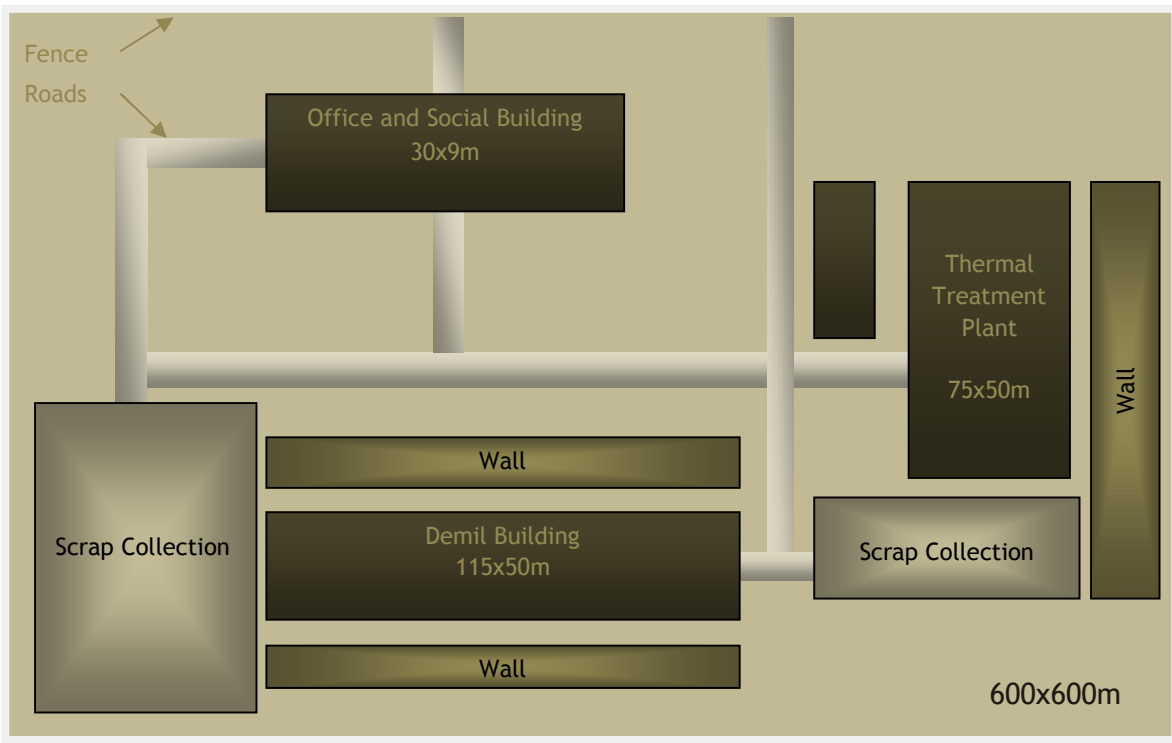


Figure 3: Schematic ADP factory plan for South Africa

2) ARCHAEOLOGICAL SCOPING

The archaeological scoping study comprises of 2 parts, namely;

1. A basic literature research including Cultural Resources Management (CRM) assessments and consultation with the McGregor Museum, Kimberley, as provincial repository and archaeological recording centre of the Northern Cape; and
2. An introductory site visit to the study area (2008-10-08) by the BKS environmental team.

Archaeological scoping is presented along a brief outline of the southern African Culture-Historic Periods with reference to site types that may be present in the proposed development area, set against preliminary findings during the site visit.

2.1) THE SOUTHERN AFRICAN CULTURE-HISTORIC PERIODS

2.1.1) EARLY HOMINID / HOMININ EVOLUTION

The break-up of Gondwanaland, 140-120 Million years ago (Mya), proved a definitive event in the geographic outline of southern Africa. Shortly thereafter volcanic activity across the interior of South Africa ended deposition of the sedimentary Karoo sequence. Significant downwarping followed along the continent's margins and erosion initiated formation of the Great Escarpment, separating the interior plateau from the coastal regions. By 65Mya the sub-continent consisted of extensive plains, surrounded by mountains to the east (E), south (S) and west (W). The late Pliocene is marked by major tectonic uplift of the eastern (E) side of Africa, strongly influencing climate and concentrating precipitation on the windward side of the uplifted areas (McCarthy & Rubidge 2005); a climatic change that may well have been pivotal in creating the evolutionary conditions for the differentiation of the hominin lineage (Vrba *et. al.* 1995).

Fossil evidence from the Fayum, now a desert area south (S) of Cairo in Egypt, attests to the existence of a rich array of primate forest dwellers during the late Eocene and Oligocene (33-36Mya). Primate fossils include specimens of both anthropoids and prosimians. Living descendants of these anthropoids are divided into 3 superfamilies; the *Ceboidea* (New World monkeys), the *Cercopithecoidea* (Old World monkeys), and the *Hominoidea* (apes & humans). Of the 3 superfamily groups the *Hominoidea* are central to any discussion on human origins in the mid-Miocene (16-12Mya). During this period hominid diversity decreased, but spread

beyond Africa to Eurasia via the progressively closing Tethys seaway. Apes in Eurasia were widespread until about 8Mya when their habitats shrank, most possibly as a result of uplift along the Himalayan-Alpine tectonic axis (McCarthy & Rubidge 2005).

DNA studies indicates that in Africa humans and chimpanzees shared a common ancestor around 8Mya (Sibley & Ahlquist 1984). By 4Mya, based on fossil evidence from Ethiopia and Kenya, hominins (humans and their immediate fossil ancestors and relatives) had already evolved. The earliest fossils are ascribed to *Ardipithecus ramidus* (4.4Mya), succeeded by *Australopithecus anamensis* (4.2-3.9Mya). These fossils are inferred to lie at the base from which all other hominins evolved (Leakey *et al.* 1995; White *et al.* 1994). Later hominins fall into 3 groups or distinct genera; *Australopithecus* (gracile australopithecines), *Paranthropus* (robust australopithecines) and *Homo*.

A general description of the australopithecines (*Australopithecus* and *Paranthropus*) would include definite bipedalism, while skeletally still retaining evidence of arboreal adaptation. Cranial capacity varied from 350-530cm³, with large projecting faces and large cheek teeth. *Homo* on the other hand exhibit trends towards increased cranial capacity (530-1,500cm³), stature and body weight, reduction in dentition, jaws and cranial

crests, delayed maturation rates and more obligatory bipedalism (Klein 1999).

Between 4-3Mya the East African record is dominated by *A. afarensis*, with the most famous fossil evidence being the Lucy skeleton from Hadar in Ethiopia (Johanson & Edey 1981) and the Laetoli footprints, Tanzania (Hay & Leakey 1982).

South Africa has 3 major hominin sites:

1. Taung in the North-West Province, where Raymond Dart identified the first *Australopithecus* fossil in 1924 (Dart 1925);
2. The Cradle of Humankind (Sterkfontein Valley) sites in Gauteng, the most prolific hominin locality in the world for the period dating 3.5-1.5Mya which have yielded numerous *Australopithecus*, *Paranthropus* and limited *Homo* fossils (Keyser *et al.* 2000; Tobias *et al.* 2000); and
3. Makapansgat in the Limpopo Province, which yielded several more specimens believed to be

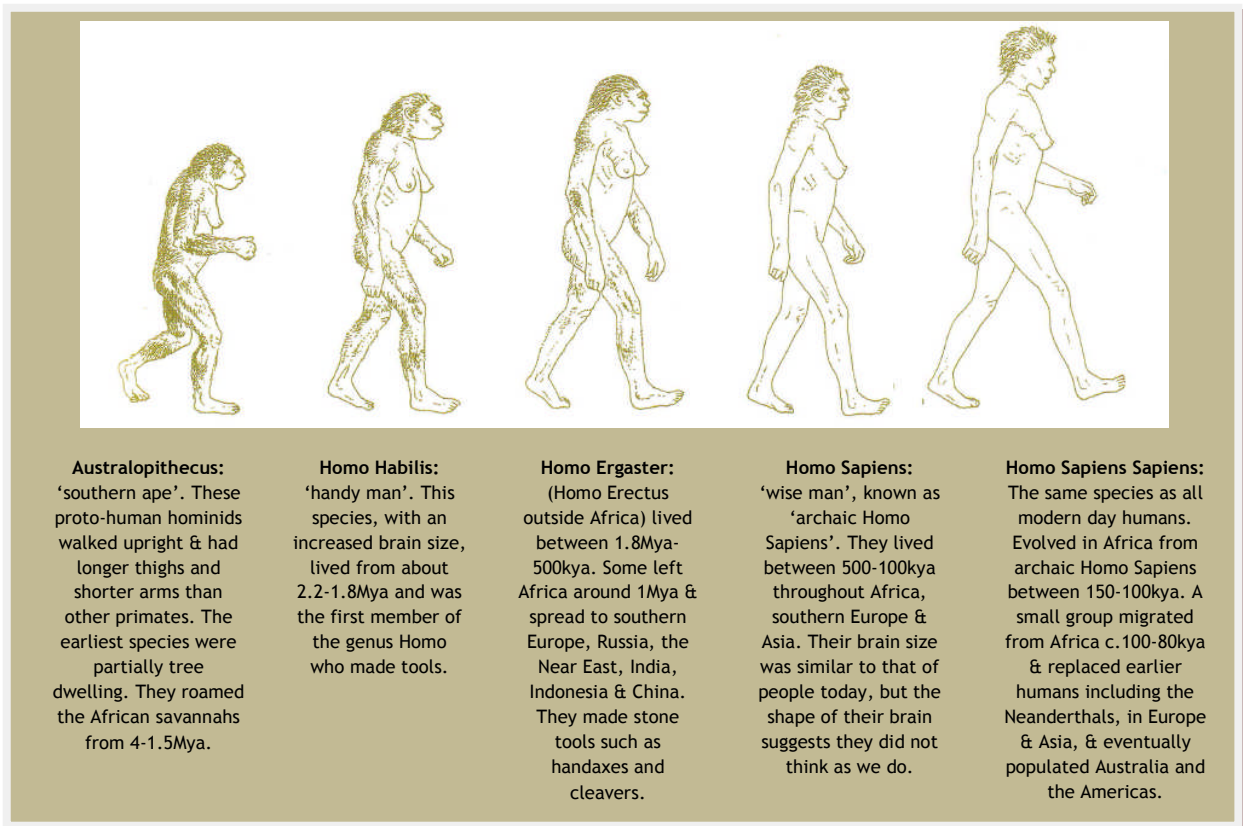
older than most of the Cradle specimens (Klein 1999).

A. africanus, represented at all 3 sites, are believed to have been present on the South African landscape from about 3Mya. From approximately 2.8Mya they shared, at least in the Cradle area, the landscape with *P. robustus* and from roughly 2.3Mya with early forms of *Homo* (Clarke 1999).

Global climatic cooling around 2.5Mya may have stimulated a burst of species turnover amongst hominins (Vrba 1992). The approximate contemporary appearance of the first stone tools does suggest that this was a critical stage in human evolution; but exactly which early hominin population should be accredited as the ancestor of *Homo* remains elusive.

H. ergaster is present in the African palaeo-anthropological record from around 1.8Mya and shortly thereafter the first exodus from Africa (*Out of Africa 1* model) is evidenced by *H. erectus* specimens from China, Indonesia and even Europe (Klein 1999).

Figure 4: Human evolution: A basic outline



Archaeologically the southern African cultural environment is roughly divided into the Stone Age, the Iron Age and the Historical Period. This cultural division has a rough temporal association beginning with the Stone Age, followed by the Iron Age and the Historical Period. The division is based on the identified primary technology used. The hunter-gatherer lifestyle of the Stone Age is identified in the archaeological record through stone being the primary raw material used to produce tools. Iron Age people, known for their skill to work iron and other metal, also practiced agriculture and animal husbandry. Kingdoms and civilizations associated with the Iron Age are indicative of a complex social hierarchy. The Historical Period is marked by the advent of writing, in southern Africa primarily associated with the first European travelers (Mitchell 2002).

During the latter part of the Later Stone Age (LSA) hunter-gatherers shared the cultural landscape with both pastoralists and Early Iron Age people, while the advent of the Historical Period is marked by a complex cultural mosaic of people; including LSA hunter-gatherers, Later Iron Age farming communities and colonial occupation.

2.1.2) THE STONE AGE

2.1.2.1) THE EARLIER STONE AGE

In South Africa the only Earlier Stone Age (ESA) Oldowan lithic assemblage comes from Sterkfontein Cave. The predominant quartz assemblage is technologically very simple, highly informal and inferred to comprise exclusively of multi-purpose tools (Kuman *et al.* 1997). Not all artefacts from the early assemblages are made from stone; several long-bone polished fragments from Drimolen, Swartkrans and Sterkfontein, Cradle of Humankind, may have been used as digging tools (Brain 1985; Backwell & d'Errico 2000).

The latter part of the ESA is characterised by the Acheulean Industrial Complex, present in the archaeological record from at least 1.5Mya. Both *H. ergaster* and *P. robustus* may be accredited for the production of these tools. However, if a primary role for stone tools was to increase access to meat and bone marrow, as cutmark and microwear evidence suggests, stone tool production would fit the presumed greater interest in meat eating by *Homo*. The combination of extended tool use and greater dietary breadth with more efficient heat regulation and locomotion may have been vital to *Homo's* evolutionary success; and the eventual extinction of the robust australopithecines (Klein 1999).

Probably the longest lasting artefact tradition ever created by hominins, the Acheulean is found from Cape Town to north-western Europe and India, occurring widely in South Africa. Despite the many sites it is still considered a 'prehistoric dark age' by many archaeologists, encompassing one of the most critical periods in human evolution; the transition from *H. ergaster* to archaic forms of *H. Sapiens* (Klein 1999).

The Acheulean industry is characterised by handaxes and cleavers as *fossiles directeurs*, in association with cores and flakes. Handaxes and cleavers occur in a variety of shapes. Handaxes are elongated pear-shaped or triangular in form, terminating in a point, while cleavers have a broad axe-like cutting edge. Handaxes and cleavers were multi-purpose tools used to work both meat and plant matter (Binneman & Beaumont 1992). The lithic artefact component was probably supplemented by wood and other organic material (Deacon 1970). Prominent South African sites include Wonderwerk Cave (Beaumont 1990), the Cave of Hearths and Olieboompoort (Mason 1962).

Later Acheulean flaking techniques involved a degree of core preparation that allowed a single large flake of

predetermined shape and size to be produced. In the western-central interior this is represented by the so-called Victoria West cores (Inskeep 1978). Both endstruck and sidestruck flakes could be produced. The Victoria West technique

2.1.2.2) THE MIDDLE STONE AGE

The Middle Stone Age (MSA), dating from approximately 300 Thousands of years ago (kya) to 40-27/23kya is interpreted as an intermediate technology between the Acheulean and the Later Stone Age (LSA) (Goodwin & van Riet Lowe 1929). Typologically the MSA is characterized by the absence of handaxes and cleavers, the use of prepared core techniques and the production of blades, triangular and convergent flakes, with convergent dorsal scars and faceted striking platforms, often produced by means of the *Levallois technique* (Volman 1984). The widespread occurrence of MSA technology across Africa and its spread into much of Eurasia in Oxygen Isotope Stage (OIS) 7 is viewed as part of a process of population dispersal associated with both the ancestors of the later Neanderthals in Europe and anatomically modern humans in Africa (Foley & Lahr 1997).

Persuasive evidence of ritual activity or bodily decoration is evidenced by the widespread presence of red ochre at particularly MSA 2 sites (after Volman's 1984 MSA 1-4 model), while evidence from Lion Cave, Swaziland, indicates that specularite may have been mined as early as 100kya (Beaumont 1973). Presumably the pigments were used in body decoration, but decoration of artefacts, hide-working and use in barrier creams are also possible. Evidence for symbolic behavioral activity is largely absent; no evidence for rock art or formal burial practices exists. Engraved ochre and perforated shell beads from Blombos

2.1.2.3) THE LATER STONE AGE

Artefacts characteristic of the Later Stone Age (LSA) appear in the archaeological record from 40/27-23kya and incorporates microlithic as well as macrolithic assemblages. Artefacts were produced by modern *H. sapiens* or *H. sapiens sapiens*, who subsisted on a hunter-gatherer way of life (Deacon 1984; Mitchell 2002).

indicates an origin within the Acheulean for the *Levallois technique* of the Middle Stone Age (Noble & Davidson 1966).

Cave (Hensilwood 2000) are however challenging formerly held more conservative deas.

Southern Africa's Middle Pleistocene fossil record is poor compared to the riches offered by the early hominin sites. Early Middle Pleistocene fossil evidence do suggest an archaic appearance, albeit a much larger cranial capacity (1,250cm³) and fossils are often assigned to *H. heidelbergensis* and *H. sapiens rhodesiensis* (Rightmire 1976). Modern looking remains, primarily from Border Cave (KwaZulu-Natal) and Klasies River Mouth (Eastern Cape) attests to the fact that anatomically modern humans had, by 120kya, been present on the South African landscape, before migrating from Africa around 100-80kya to other parts of the world (Brauer 1982; Stringer1985). Subsequent studies of modern DNA indicated that African populations are genetically more diverse and probably older than those elsewhere (Cann *et al.* 1987). Combined, the fossil and genetic evidence underpins the so-called *Out of Africa 2* model (arguing that gene flow and natural selection led regional hominin populations along distinct evolutionary trajectories after *Homo's* expansion from Africa in the Lower Pleistocene; the *Out of Africa 1* model) of modern human origins and the continuing debate as to whether it should be preferred to its *Multiregional* alternative, arguing that modern humans evolved more or less simultaneously right across the Old World (Mellars & Stringer 1989; Aitken *et al.* 1993; Nitecki & Nitecki 1994).

Temporally the LSA can be divided into 4 broad units associated with climatic, technological and subsistence changes:

1. Late Pleistocene microlithic assemblages (40-12kya);

2. Terminal Pleistocene / early Holocene non-microlithic assemblages (12-8kya);
3. Holocene microlithic assemblages (8kya to the Historic Period); and
4. Holocene assemblages with pottery (2kya to the Historic Period) closely associated with the influx of pastoralist communities into South Africa (Mitchell 2002).

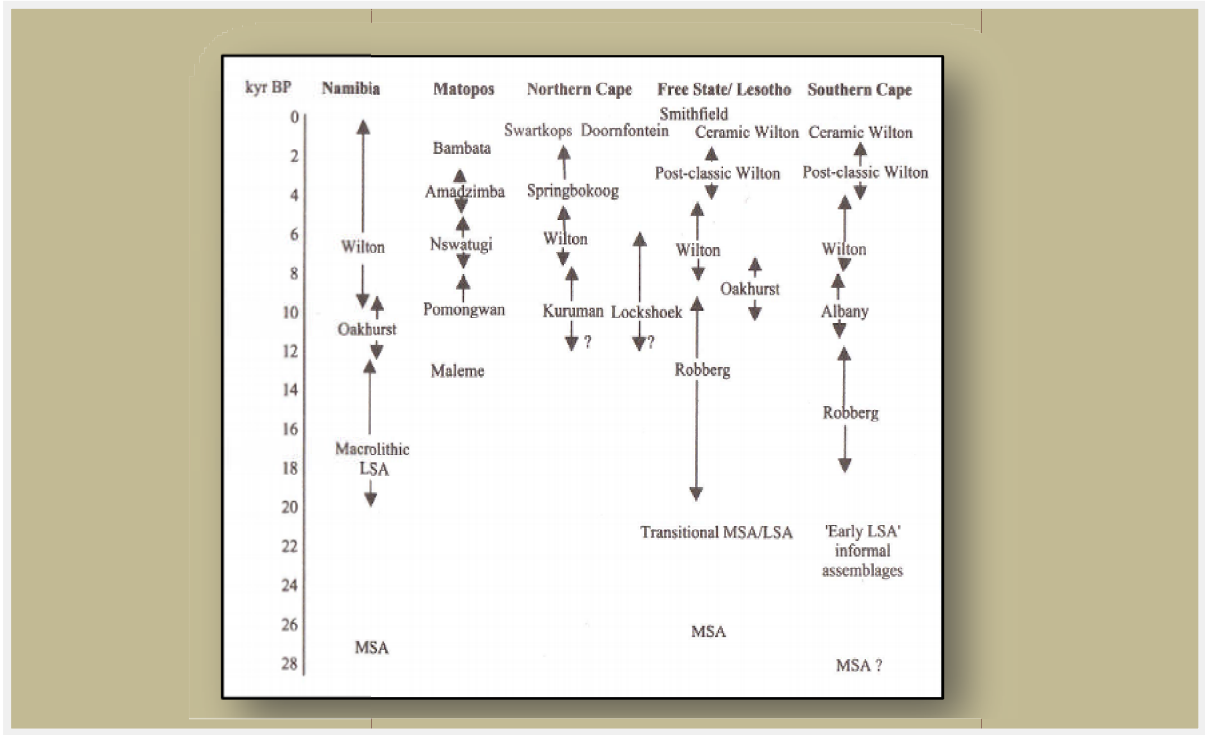
Elements of material culture characteristic of the LSA reflect modern behavior. Deacon (1984) summarizes these as:

1. Symbolic and representational art (paintings and engravings);
2. Items of personal adornment such as decorated ostrich eggshell, decorated bone tools and beads, pendants and amulets of ostrich eggshell, marine and freshwater shells;
3. Specialized hunting and fishing equipment in the form of bows and arrows, fish hooks and sinkers;
4. A greater variety of specialized tools including

5. bone needles and awls and bone skin working tools;
6. Specialised food gathering tools and containers such as bored stone digging stick weights, carrying bags of leather and netting, ostrich eggshell water containers, tortoiseshell bowls and scoops and later pottery and stone bowls;
7. Formal burial of the dead in graves (sometimes covered with painted stones or grindstones and accompanied by gravegoods);
8. The miniaturization of selected stone tools linked to the practice of hafting for composite tools production; and
9. A characteristic range of specialized tools designed for making some of the items listed above.

The Later Stone Age Culture Historic Period incorporates Pastoralism or the African Neolithic, where the hunter-gatherer lifestyle was, albeit sometimes only for brief periods, and sometimes practiced alongside animal husbandry, requiring a more sedentary way of life.

Figure 5: Later Stone Age traditions of southern Africa



2.1.3) THE IRON AGE

For close to 2 millennia people combining cereal agriculture with stock keeping have occupied most of southern Africa's summer rainfall zone. The rapid spread of farming, distinctive ceramics and metallurgy is understood as the expansion of a Bantu-speaking population, in archaeological terms referred to as the Iron Age.

2.1.3.1) THE EARLY IRON AGE

From around 3kya African societies north of the Congo and Serengeti practiced diverse forms of food production. Further south, the perceived homogeneity of the material culture of the earliest agricultural groups and the fact that this was introduced rapidly and without local precursors has led archaeologists to conclude that it must reflect the physical movement of substantial numbers of people. Farming and the presumed advantages of iron tools for land clearance and cultivation are thought to have fuelled population growth (Oliver 1966). In addition linguistics identified the Cameroon / Nigeria border as the centre of origin for Bantu languages (Dalby 1975).

Ceramic typology is central to current discussions of the expansion of iron using farming communities. The most widely used approach is that of Huffman (1980), who employs a multidimensional analysis of 3 variables; vessel profile, decoration layout and motif to reconstruct different ceramic types. Huffman (1989) argues that since large zones of ceramic uniformity are often punctuated by short distances over which style changes substantially, these changes in non-verbal communication may also mirror patterning in verbal communication such as language. If this is correct then ceramics can be used to trace the movements of people, though not necessarily of specific social or political groupings. Huffman's Urewe Tradition coincides largely with Phillipson's (1977) *Eastern Stream*. A combined Urewe Tradition / *Eastern Stream* model can be summarized as:

1. The Kwale branch (extending along the coast from Kenya to KwaZulu-Natal);
2. The Nkope branch (located inland and reaching from southern Tanzania through Malawi and eastern Zambia into Zimbabwe); and
3. The Kalundu branch (stretching from Angola through western Zambia, Botswana and Zimbabwe into South Africa).

In southern Africa, recent work distinguishes two phases of the Kwale branch. The earlier Silver Leaves facies (250-430BP) occur as far south as the Northern Province. The later expression or Mzonjani facies (420-580BP) occurs in the Northern Province as well as along the KwaZulu-Natal coastal belt (Huffman 1998). Since the Silver Leaves facies is only slightly younger than the Kwale type site in Kenya, very rapid movement along the coast, perhaps partly by boat, is inferred (Klapwijk 1974). Subsequently (550-650BP) people making Mzonjani derived ceramics settled more widely in the interior of South Africa.

Assemblages attributable to the Nkope branch appear south of the Zambezi but north of South Africa from the 5th Century. Ziwa represents an early facies, with Gokomere deriving jointly from Ziwa and Bambata. A subsequent phase is represented by the Zhizo facies of the Shashe-Limpopo basin, and by Taukome (Huffman 1994). Related sites occur in the Kruger National Park (Meyer 1988). Zhizo (7-10th Century) is ancestral to the Toutswe tradition which persisted in eastern Botswana into the 13th Century.

Kalundu origins need further investigation; its subsequent development is however better understood. A post Bambata phase is represented by 5-7th Century sites of Happy Rest, Klein Africa and Maunatlana in the Northern Province and Mpumalanga (Prinsloo 1974, 1989). Later phases are present at the Lydenburg Heads site (Whitelaw 1996) and by the succession of Mzuluzi, Ndongonwane and Ntshokane in KwaZulu-Natal (7-10th Centuries) (Prins & Grainger 1993). Later Kalundu facies include Klingbeil and Eiland in the northern part of the country (Evers 1980) with Kgopolwe being a lowveld variant in Mpumalanga (10-12th Century). Broadhurst and other sites indicate a still later survival in Botswana (Campbell1991).

Despite the importance accorded to iron agricultural implements in expanding the spread of farming and frequent finds of production debris, metal objects are rare. Metal techniques were simple, with no particular sign of casting, wire drawing or hot working. Jewellery (bangles, beads, pendants etc.) constitute by far the largest number of finds but arrows, adzes, chisels, points and spatulae are known (Miller 1996).

Early Iron Age people were limited to the Miombo and Savannah biomes; excluded from much of the continent's western half by aridity and confined in the south during the 1st millennium to bushveld areas of the old Transvaal. Declining summer rainfall restricted occupation to a diminishing belt close to the East Coast and north of S33° (Maggs 1994); sites such as Canasta Place, Eastern Cape, marks the southern most limit of Early Iron Age settlement (Nogwaza 1994).

THE CENTRAL CATTLE PATTERN: The Central Cattle Pattern (CCP) was the main cognitive pattern since the Early Iron Age (Huffman 1986). The system can be summarized as opposition between male pastoralism and female agriculture; ancestors and descendants; rulers and subjects; and men and women. Cattle served as the primary means of transaction; they represented symbols exchanged for the fertility of wives, legitimacy of children and appeasement of ancestors. Cattle were also used as tribute to rulers confirming subordination and redistribution as loan cattle by the ruler to gain political support. Cattle represented healing and fertilizing qualities (Huffman 1998; Kuper 1980).

This cognitive and conceptual structure underlies all cultural behavior, including the placement of features in a settlement: The oppositions of male and female, pastoralism and agriculture, ancestors and descendants, rulers and subjects, cool and hot are represented in spatial oppositions, either concentric or diametric (Huffman 1986).

A typical CCP village comprises of a central cattle enclosure (byre) where men are buried. The *Kgotla* (men's meeting place / court) is situated adjacent to the cattle enclosure. Surrounding the enclosure is an arc of houses, occupied according to seniority. Around the outer perimeter of the houses is an arc of granaries where women keep their pots and grinding stones (Huffman 1986). The model varies per ethnic group which helps to distinguish ethnicity throughout the Iron Age, but more studies are required to recognize the patterns.

2.1.3.2) THE MIDDLE IRON AGE

The hiatus of the South African Middle Iron Age activity was centered in the Shashe-Limpopo Valley and characterized by the 5-tier hierarchical Mapungubwe State spanning some 30,000km². By the 1st millennium ivory and skins were already exported overseas, with sites like Sofala and Chibueni, Mozambique, interfacing between interior and transoceanic traders. Exotic glass beads, cloth and Middle Eastern ceramics present at southern African sites mark the beginning of the region's incorporation into the expanding economic system that, partly tied together with maritime trading links across the Indian Ocean, increasingly united Africa, Asia and Europe long before Da Gama or Columbus (Eloff & Meyer 1981; Meyer 1998).

Occupation was initially focused at Bambandanyalo and K2. The Bambandanyalo main midden (1030-1220BP) stands out above the surrounding area, reaching more than 6m in places. Covering more than 8ha and possibly housing as many as 2,000 people (Meyer 1998). The CCP was not strictly followed; whether this is ideologically significant or merely a reflection of local topography remains unclear. The midden, the size of which may reflect the status of the settlement's ruler, engulfed the byre around 1060-1080BP, necessitating relocation of the cattle previously kept there. The reorganization of space and worldview implied suggests profound social changes even before the sites' abandonment in the early 13th Century, when the focus of occupation moved to Mapungubwe Hill, 1km away (Huffman 1998).

Excavations at Mapungubwe Hill, though only occupied for a few decades (1220-1290BP), yielded a deep succession of gravel floors and house debris (Eloff & Meyer 1981). Huffman (1998) suggests that the suddenness with which Mapungubwe was occupied may imply a deliberate decision to give spatial expression to a new social order in which leaders physically removed themselves from ordinary people by moving onto more inaccessible, higher elevations behind the stone walls demarcating elite residential areas. Social and settlement changes speak of considerable centralization of power and perhaps the elaboration of new ways of linking leaders and subjects.

At Bambandanyalo and Mapungubwe elite burial gravegoods include copper, bone, ivory and gold ornaments and beads. Social significance of cattle is reinforced by their importance among the many human

2.1.3.3) THE LATER IRON AGE

South African farming communities of the 2nd millennium experienced increased specialization of production and exchange, the development of more nucleated settlement patterns and growing political centralization, albeit not to the same extent as those participating in the Zimbabwe tradition. However together they form the background to the cataclysmic events of the late 18th / early 19th Century *Mfecane* (Mitchell 2002).

Archaeological evidence of settlement pattern, social organization and ritual practice often differ from those recorded ethnographically. The Moloko ceramic tradition seems to be ancestral to modern Sotho-Tswana speakers (Evers 1983) and from about 1 000BP a second tradition, the Blackburn tradition, appears along South Africa's eastern coastline. Blackburn produced mostly undecorated pottery (Davies 1971), while Mpambanyoni assemblages, reaching as far south as Transkei, includes examples of rim notching, incised lines and burnished ochre slip (Robey 1980). At present, no contemporary farming sites are known further inland in KwaZulu-Natal or the Eastern Cape.

Huffman (1989) argues that similarities between Blackburn and early Maloko wares imply a related origin,

and animal ceramic figurines and at least 6 'beast burials' (Meyer 1998).

Today the drought prone Shashe-Limpopo Valley receives under 350mm of rainfall per annum, making cereal cultivation virtually impossible. The shift to drier conditions in the late 1200's across the Shashe-Limpopo basin and the eastern Kalahari may have been pivotal in the break-up of the Mapungubwe polity, the collapse of Botswana's Toutswe tradition and the emergence of Great Zimbabwe (1220-1550BP), southern Africa's best known and largest (720ha) archaeological site (Meyer 1998).

South of the Limpopo and north of the Soutpansberg, Mapungubwe derived communities survived into the 14th Century, contemporary with the establishment of Sotho-speaking makers of Maloko pottery.

presumably in the Chifumbaze of Zambia or the Ivuna of Tanzania, which contains a range of ceramic attributes important in the Blackburn as well as beehive grass huts similar to those made by the Nguni. This is one of the few suggestions of contact between Sotho-Tswana and Nguni speakers on the one hand and farming communities who, if Huffman is correct, were already long established south of the Limpopo. Both ethnographic and archaeological data demonstrate that Sotho-Tswana and Nguni are patrilineal and organize their settlements according to the CCP (Kuper 1980).

From 1300BP there is increasing evidence for the beginning of agropastoralist expansion considerably beyond the area of previous occupation. It is also to this time that the genealogies of several contemporary Bantu speaking groups can be traced (Wilson & Thompson 1969). Associated with this expansion was the regular employment of stone, rather than wood, as building material, an adaptation that has greatly facilitated the discovery and identification of settlements. Maggs (1976) describes 4 basic settlement types all characterized by the use of semi weathered dolomite to produce hard binding *daga* for house floors and a wall building tradition employing larger more regular stones for the inner and outer faces and

smaller rubble for the infill. As with the more dispersed homesteads of KwaZulu-Natal and the Eastern Cape, sites tend to be in locally elevated situations, reflecting a deep seated Sotho and Nguni preference for benign higher places rather than supernaturally dangerous riverside localities; another important contrast to both 1st millennium (Maggs 1976) and later Zulu Kingdom settlement patterns (Hall & Maggs 1979).

The lack of evidence for iron production in the interior and eastern part of South Africa emphasize exchange relationships between various groups and associated more centralized polities. By the 19th Century iron production in KwaZulu-Natal was concentrated in particular clans and lineages and associated with a range of social and religious taboos (Maggs 1992). South of Durban comparatively few smelting sites are known (Whitelaw 1991), a trend even more apparent in Transkei (Feely 1987). However, metal remained the most important and archaeologically evident item traded between later farming communities. (Other recorded trade items include glass and ostrich eggshell beads; Indian Ocean seashells; siltstone pipes; *dagga*, and later on tobacco; pigments including ochre, graphite and specularite; hides and salt.)

Rising polity settlements are particularly evident in the north of the country and dated to the 17th Century, including Molokwane, capital of the Bakwena chiefdom (Pistorius 1994) and Kaditshwene, capital of a major section of the Hurutshe, whose population of 20,000 in 1820 equaled contemporary Cape Town in size (Boeyens 2000). The agglomeration of Tswana settlements in the north of the country was fuelled by both population growth and conflict over access to elephant herds for ivory and long distance trade with the East Coast. During this period ceramic decoration became blander and more standardized than the earlier elaborate decoration that included red ochre and graphite coloring.

The *Mfecane* refers to the wars and population movements of the early 19th Century which culminated in the establishment of the Zulu Kingdom and came to affect much of the interior, even beyond the Zambezi.

The late 18th Century was marked by increasing demands for ivory (and slaves) on the part of European traders at Delagoa Bay; as many as 50 tones of ivory were exported annually from 1750-1790. As elephant populations declined, competition increased both for them and for the post 1790 supply of food to European and American whalers calling at Delagoa Bay (Smith 1970). Cattle raiding, conflict over land and changes in climatic and subsistence strategies characterized much of the cultural landscape of the time.

Competition for access to overseas trade encouraged some leaders to replace locally organized circumcision schools and age-sets with more permanently maintained military regiments. These were now used to gain access through warfare to land, cattle and stored food. By 1810 three groups, the Mthethwa, Ndwandwe and Ngwane dominated northern KwaZulu-Natal (Wright 1995).

The Mthethwa paramountcy was undermined by the killing of its leader Dingiswayo in *circa* 1818, which led to a brief period of Ndwandwe dominance. In consequence one of Dingiswayo's former tributaries, Shaka, established often forceful alliances with chiefdoms further south. Shaka's Zulu dominated coalition resisted the Ndwandwe who in return fled to Mozambique. As the Zulu polity expanded it consolidated its control over large areas, incorporating many communities into it. Others sought refuge from political instability by moving south of the Thukela River, precipitating a further *domino effect* as far as the Cape Colony's eastern border (Wright 1995).

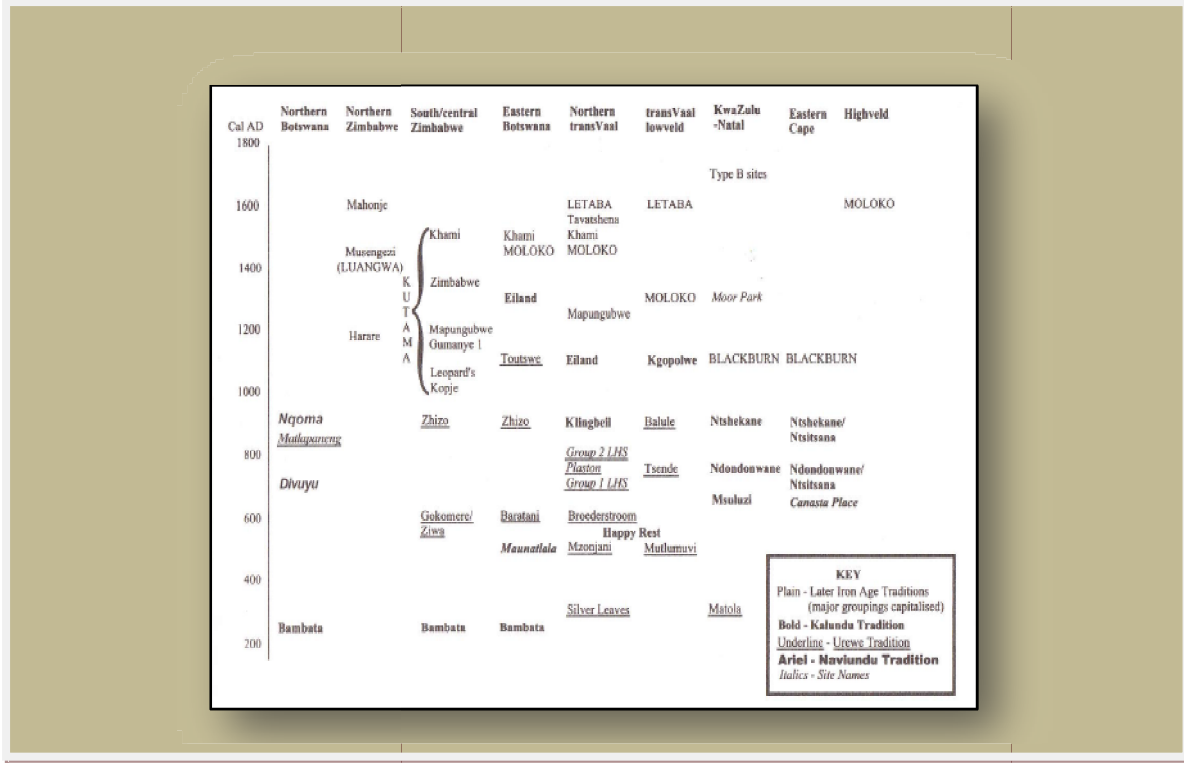


Figure 6: Major ceramic traditions of southern African Iron Age farming communities

2.1.4) THE HISTORICAL/COLONIAL PERIOD

In the 15th Century Admiral Zheng He and his subordinates impressed the power of the Ming Dynasty rulers in a series of voyages as far afield as Java, Sri Lanka, southern Arabia and along the East African coast, collecting exotic animals *en route*. But nothing more came of his expeditions and China never pursued opportunities for trade or colonization (Mote 1991).

Portuguese maritime expansion began around the time of Zheng He's voyages; motivated by a desire to establish a sea route to the riches of the Far East. By 1485 Diogo Cão had reached Cape Cross, 3 years later Bartolomeu Dias rounded the Cape of Good Hope and less than a decade later Vasco da Gama called at several places along South Africa's coast, trading with Khoekhoen at Mossel Bay before reaching Mozambique and crossing the ocean to India. His voyage initiated subsequent Portuguese bases from China to Iraq. In Africa interest was focused on seizing important coastal trading towns such as Sofala and gaining access to the gold of Zimbabwe. Following the 1510 Portuguese-Khoekhoen battle at Table Bay, in which the viceroy of India was killed,

Portuguese ships ceased to call along the South African coast (Elphick 1985).

By the late 1500's Portuguese supremacy of the Indian Ocean was threatened. From 1591 numerous Dutch and English ships called at Table Bay and in 1652 the Dutch East Indian Company (VOC) established a permanent base, with the intent to provide fresh food and water to VOC ships. In an attempt to improve the food supply a few settlers (freeburghers) were allowed to establish farms. The establishment of an intensive mixed farming economy failed due to shortages of capital and labor, and freeburghers turned to wheat cultivation and livestock farming. While the population grew slowly the area of settlement expanded rapidly with new administrative centers established at Stellenbosch (1676), Swellendam (1743) and Graaf-Reinet (1785). By the 1600's the Colony's frontier was too long to be effectively policed by VOC officials (Elphick 1985).

From the 1700's many settlers expanded inland over the Cape Fold Mountain Belt. The high cost of overland

transport constrained the ability to sell their produce while settlement of the interior was increasingly made difficult by resident KhoiSan groups, contributing due to a lack of VOC military support to growing Company opposition in the years before British control of the Cape (1795 / 1806) (Davenport & Saunders 2000).

In 1820 a major British settlement was implanted on the eastern frontier of the Cape Colony, resulting in large numbers of the community moving into the interior, initially to KwaZulu-Natal, and then after Britain annexed Natal (1843), further into the interior to beyond the Vaal

River. Disruptions of the *Mfecane* eased their takeover of Africa lands and the *Boers* (farmers) established several republics. A few years later the 2nd South African War saw both the South African and Orange Free State republics annexed by Britain, a move largely motivated by British desire to control the goldfields of the Witwatersrand. With adjacent regions of the sub-continent also falling, directly or indirectly, under British rule and German colonization of Namibia, European control of the whole of southern Africa was firmly established before the 1st World War (Davenport & Saunders 2000).

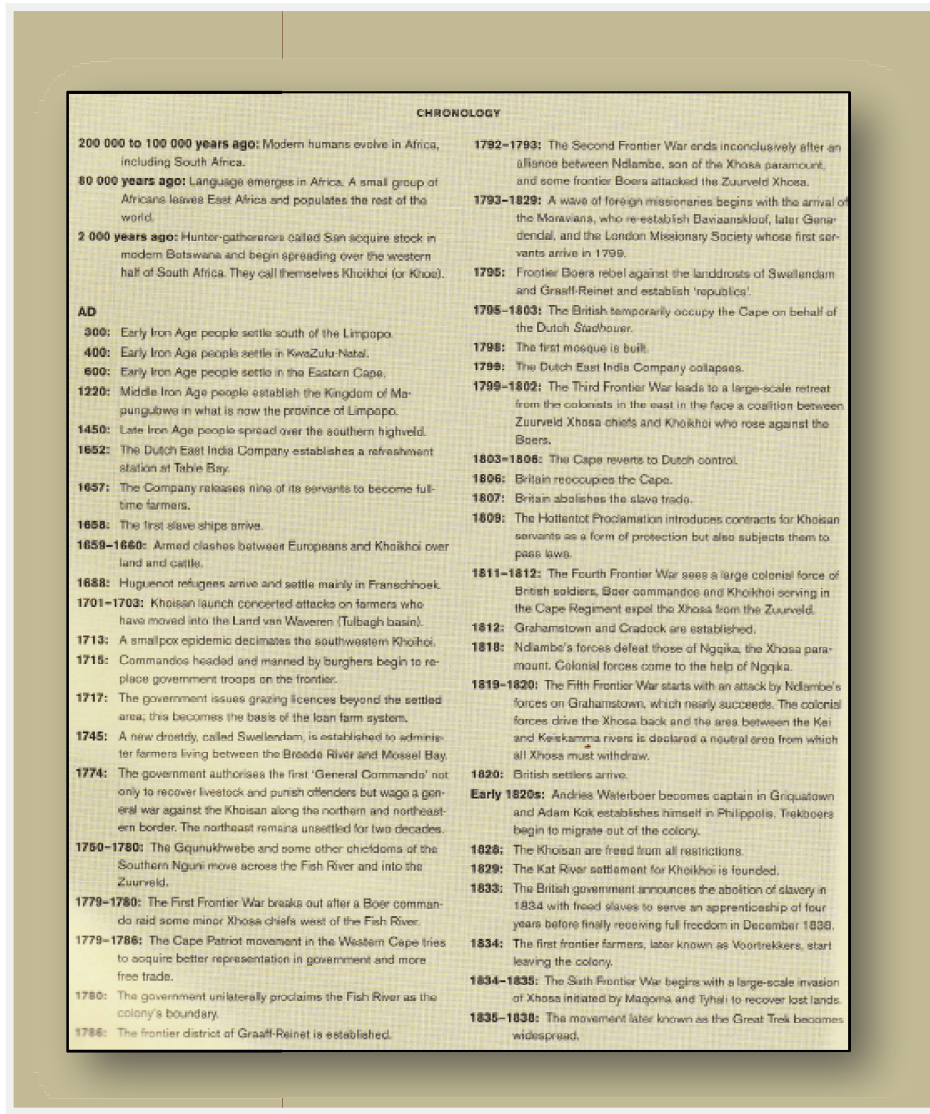


Figure 7: Schematic outline of South Africa's Historical / Colonial Period

2.2) PROBABILITY ASSESSMENT & KNOWN HERITAGE SENSITIVITY

The town De Aar is named after the farm 'De Aar'; first surveyed in September 1837 and subdivided in 1839. The subdivision, bought by Jan Gabriel Vermeulen, was named 'De Aar', the Dutch of which translates to 'vein' after an underground watercourse in the area (<http://INFO/De Aar.mht>, <http://uk.geocities.com>).

Surveys carried out in 1881 identified the property as suitable for the primary junction for interior railways on the Cape Government Railways (CGR) system. In the same year the farm was bought by the government and the first railway line from Kimberley to Cape Town built and completed in November 1883, and opened to the public in 1884. The railway station at De Aar was initially named 'Brounger Junction', after William George Brounger, chief engineer of the CGR and the prime architect of the system's growth from the time of his arrival in Cape Town (1857) until his retirement. Pressure among Karoo farmers and politicians was too strong and the stations' platform 'Brounger Junction' was for the past 120 years simply named 'De Aar'. To this day there is no monument to Brounger in the town; he is however accredited with the standard 1065mm gauge, known as the 'Cape gauge'. In addition to being the central point for the railway lines running from the three Cape Ports of Cape Town, Port Elizabeth and East London, the De Aar station also played a pivotal role as link to South West Africa following World War 1 (<http://uk.geocities.com>).

In 1902 the brothers Isaac and Wolf Friedlander, owners of the shop and hotel at the station, bought the farm 'De Aar' for 11,000 Sterling and subdivided it, providing land for churches, a town hall and sports fields. Residential and commercial plots were sold by auction in December 1902 and on the 20th of May 1904 the town was declared a municipality (<http://uk.geocities.com>).

The South African novelist Olive Schreiner lived in De Aar from 1907-1913 when her husband, Samuel Cronwright-Schreiner, was appointed town clerk and market master. Their house has been converted to a museum and restaurant (<http://INFO/De Aar.mht>).

Olive Emilie Albertina Schreiner (1855-1920) was the 6th of 12 children of Gottlieb Schreiner and Rebecca Lyndall, both of missionary descent and sent to South Africa by the London Missionary Society (LMS) in 1854. At the age of 12 she left home and worked as housekeeper for her older brothers and sisters. From 1871-80 she worked as governess on Eastern Cape farms; during this time she first became acquainted with the work of Charles Darwin, Herbert Spencer, John Stuart Mill and Ralph Waldo Emerson. Several drafts of her most noted works also stem from this period, including *The Story of an African Farm* (1883), *From Man to Man* (1926) and *Undine* (1929). In 1881 she travelled to England to find a publisher for her manuscripts. The *Story of an African Farm* was accepted by Chapman & Hall and gave Schreiner an entry to the progressive literary and political circles of England. Upon her return to South Africa in 1889 she stayed in Cape Town and published polemical articles. In 1894 she married Samuel Cronwright, an ostrich farmer and lawyer-politician, and travelled extensively with him to England and around South Africa. *Trooper Peter Halket of Mashonaland*, an attack on the racist policies of Cecil John Rhodes, was published in 1897. Just before the outbreak of the Anglo-Boer War she published *An English South African Woman's View of the Situation* (1899), and the following year was placed under martial law, with her house looted and burnt down. After the war Schreiners' protectiveness towards the Boers gradually faded. The outbreak of

World War 1 saw her progressively advocating pacifist ideas and in 1914 she decided to move back to England. Schreiner died in 1920, shortly after her return to South Africa with her husband. She was buried under a rock sarcophagus above the Karoo Desert (<http://kirjasto.sci.fi/schrein.htm>).

The town is host to a ‘Garden of Remembrance’, honoring British troops killed during the Anglo-Boer War (<http://INFO/De Aar.mht>).

Pre-historic occupation of the general area is evidenced by known KhoiSan petroglyphs (rock engravings) on the farms Nooitgedaght, Damfontein and Brandfontein (<http://INFO/De Aar.mht>, <http://uk.geocities.com>), with the latter being located approximately 3km west of Sinclair’s Dam 133.

No known archaeological or cultural heritage resources, as defined and protected by the NHRA 1999, are located on Sinclair’s Dam 133. Cultural sensitivity of the general area is evidenced by a number of known Historical / Colonial Period sites and features as well as Pre-historic Later Stone Age hunter-gatherer / pastoralist rock engravings. Similar type sites may thus well be affected by the proposed ADP development.

PERIOD	PROBABILITY ASSESSMENT		DESCRIPTION OF CONTRIBUTION
	PROBABILITY	SIGNIFICANCE	
Hominid / Human	Low	High	Expansion of fossil evidence for human origins and evolution
STONE AGE			
Earlier Stone Age	Medium	Medium – High	Assessment of distribution of early Homo; occupation of selected biomes and adaptation patterns
Middle Stone Age	Medium	Medium – High	Assessment of distribution of Homo Sapiens; occupation of selected biomes / adaptation patterns; early modern behavior
Later Stone Age:			
- Hunter-gatherer	High	High	Modern behavior; ethno-archaeology; cultural interaction between LSA hunter-gatherers, pastoralists and Colonial cultures. Linguistics
- Pastoralist	High	High	Pastoralist migration & adaptation patterns, cultural interaction with LSA hunter-gatherer and Colonial cultures
- Rock Art	High	Medium – High	Spread of KhoiSan people and related adaptation. Possibility of art by other cultural groups. Alternative documentation relating to acculturation. Socio-economic pressure / Religion / Myth
IRON AGE			
Early Iron Age	Not expected	N/A	Known extent of occupation not applicable to the study area
Middle Iron Age	Not expected	N/A	Known extent of occupation not applicable to the study area
Later Iron Age	Low	Low – Medium	Known extent of occupation not applicable to the study area
Post <i>Mfecane</i>	Medium	Medium	Socio-economic cultural change; Migrant Iron Age / Colonial contact; cultural adaptation (including responses by local LSA hunter-gatherer and pastoralist communities)
HISTORICAL / COLONIAL PERIOD			
Historical Period	High	High	Colonial – LSA - Migrant Iron Age contact. Western cultural integration, responses to political dominance / changing socio-cultural environment

Table 1: Probability assessment of archaeological and cultural heritage sensitivity: The Sinclair’s Dam 133 study area

2.3) PRELIMINARY SITE VISIT

The introductory site visit to the study area (2008-10-08) by the BKS environmental team comprised of:

1. An information session, presented by representatives of Sanabo Demil and the DoD; and
2. Brief site visits to the 3 proposed ADP development sites as well as 2 related proposed infrastructural development areas namely the gravel and sand quarry.
3. (In addition to assessment of proposed development areas a known contemporary gravesite was visited).

The archaeological scoping assessment was done by foot and vehicle and limited to a brief surface survey of prioritized development areas. GPS co-ordinates were taken with a Garmin GPSmap 60CSx (Datum: WGS84). Photographic documentation was done with a Casio EX-S10 Exilim camera. A combination of Garmap and Google Earth software was used in the display of spatial information. Archaeological and cultural heritage site significance assessment and associated mitigation recommendations were done according to the system prescribed by SAHRA (2007).

SAHRA ARCHAEOLOGICAL AND CULTURAL HERITAGE SITE SIGNIFICANCE ASSESSMENT			
SITE SIGNIFICANCE	FIELD RATING	GRADE	RECOMMENDED MITIGATION
High Significance	National Significance	Grade 1	Site conservation / Site development
High Significance	Provincial Significance	Grade 2	Site conservation / Site development
High Significance	Local Significance	Grade 3A / 3B	Site conservation or extensive mitigation prior to development / destruction
High / Medium Significance	Generally Protected A	-	Site conservation or mitigation prior to development / destruction
Medium Significance	Generally Protected B	-	Site conservation or mitigation / test excavation / systematic sampling / monitoring prior to or during development / destruction
Low Significance	Generally Protected C	-	On-site sampling, monitoring or no archaeological mitigation required prior to or during development / destruction

Table 2: SAHRA archaeological and cultural heritage site significance assessment and mitigation recommendations

2.3.1) ARCHAEOLOGICAL AND CULTURAL HERITAGE FINDINGS AND PRELIMINARY RECOMMENDATIONS

2.3.1.1) THE 3 PROPOSED ADP DEVELOPMENT SITES

No archaeological or cultural heritage resources of significance, as defined and protected by the NHRA 1999, were identified on any of the 3 proposed ADP development sites (Sites 1-3):

1. Low densities of Stone Age lithic artefacts were present at the Site 1 and Site 2 locales. Surface finds were in both cases interpreted as ‘low density scatters’ rather than archaeological ‘sites’ and assigned a SAHRA *Low Significance* and a *Generally Protected C* field rating. Should either of the sites be identified as the ADP development site preliminary recommendations would be that the finds be destroyed *in lieu* of the development without the developer having to apply for a SAHRA *Site Destruction Permit*.
2. The proposed Site 3 locality is characterized by contemporary DoD infrastructure, no longer in use and in a steady state of decay. Infrastructure dates to approximately 30 years ago; thus post-dating 60 years of age and not formally protected under the NHRA. Development will not impact on any sites in the event of

the Site 3 being identified as the ADP development site. Preliminary recommendations would include that development proceeds as applied for.



Figure 8: General view of the proposed Site 1 ADP development area



Figure 11: Artefacts from the general Site 2 locale



Figure 9: Artefacts from the general Site 1 locale



Figure 12: General view of existing contemporary infrastructure at the proposed Site 3 ADP development area

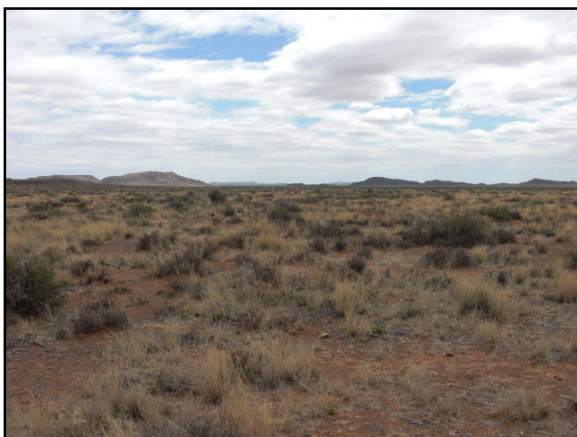


Figure 10: General view of the proposed Site 2 ADP development area



Figure 13: General view of the proposed Site 2 ADP development area

- *IT IS RECOMMENDED THAT THE FINAL ADP DEVELOPMENT SITE (SITE 1 OR SITE 2 OR SITE 3) BE SUBJECTED TO A THOROUGH PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA) PRIOR TO DEVELOPMENT. RECOMMENDATIONS AS PER THE SAHRA COMMENT ON THE PHASE 1 AIA SHOULD BE COMPLIED WITH.*

2.3.1.2) PROPOSED QUARRY SITES AND RELATED ADP DEVELOPMENT AREAS

Two quarry sites (Q2-Gravel quarry and Q4-Sand quarry) proposed for use during the construction phase of the ADP development were briefly visited:

1. Inspection at Q2 was limited to section assessment with little time spent on exploring observed shallow topsoil members. No archaeological layers are present within the large exposed sections. Possible archaeological and cultural heritage material may well be present in the approximate 20cm top layer, albeit if so, inferred to be of low density with lithic assemblages at most similar to finds at the Site 1 and Site 2 locales.
2. Time constraints did not allow physical inspection of the Q4 area. Archaeological and cultural heritage resources may well be present. If so, resources are at most inferred to be similar to the Site 1 and Site 2 low density lithic assemblages.

Should the quarries be identified as resources to be used during the construction phase of the ADP development both should be subjected to a Phase 1 AIA.



Figure 14: General view of the proposed Q1 gravel quarry site



Figure 15: Exposed quarry sections are largely culturally sterile. Limited anthropic material may be present in the approximate 20cm topsoil layer

- *IT IS RECOMMENDED THAT ALL RELATED ADP DEVELOPMENT AREAS, INCLUDING LINEAR DEVELOPMENT, AS PER SECTION 38.1 OF THE NHRA 1999, BE SUBJECTED TO A THOROUGH PHASE 1 AIA PRIOR TO DEVELOPMENT. RECOMMENDATIONS AS PER THE SAHRA COMMENT ON THE PHASE 1 AIA SHOULD BE COMPLIED WITH.*

2.3.1.3) THE KNOWN GRAVESITE

One known contemporary gravesite was visited. The site will not be directly impacted on by the proposed ADP development. The site is fenced, with one access gate; complying with SAHRA minimum site conservation standards.



Figure 16: General view of the known gravesite



Figure 17: Maintained graves located within the fenced cemetery

- *EXISTING CONSERVATION MEASURES COMPLIES WITH SAHRA MINIMUM SITE CONSERVATION STANDARDS. NO ADDITIONAL CONSERVATION MEASURES ARE RECOMMENDED.*

3) SUMMARIZED CONCLUSION AND RECOMMENDATIONS

MAP CODE	SITE	TYPE/PERIOD	DESCRIPTION	CO-ORDINATES	PRELIMINARY RECOMMENDATIONS
ARCHAEOLOGICAL SCOPING: ESTABLISHMENT OF AN AMMUNITION DISPOSAL PLANT, SINCLAIR'S DAM 133, DE AAR, NORTHERN CAPE					
SINCLAIR'S DAM 133 & IMMEDIATE SURROUNDS					
Site 1	ADP Site 1	Stone Age	Low density occurrence	S30°39'04.5"; E23°55'58.3"	Destruction (Without SAHRA Site Destruction Permit) Phase 1 AIA
Site 2	ADP Site 2	Stone Age	Low density occurrence	S30°38'32.6"; E23°57'18.3"	Destruction (Without SAHRA Site Destruction Permit) Phase 1 AIA
Site 3	ADP Site 3	-	-	S30°39'15.1"; E23°57'04.5"	No Impact (?) Phase 1 AIA
Q2	Gravel quarry	-	-	S30°41'52.1"; E23°57'54.0"	No Impact (?) Phase 1 AIA
Q4	Sand quarry	-	-	S30°38'23.6"; E23°56'30.6"	No Impact (?) Phase 1 AIA
G1	Gravesite	Contemporary	Gravesite	S30°38'45.5"; E23°57'55.6"	Conservation
OS	Oliver Schreiner	Historical Period	Museum	S30°39'53.2"; E24°01'15.2"	N/A
ST	Railway station	Historical Period	Structure	S30°39'02.3"; E24°00'50.4"	N/A
N/A	Garden of Remembrance	Historical period	Memorial	-	N/A

Table 3: Archaeological scoping assessment co-ordinates

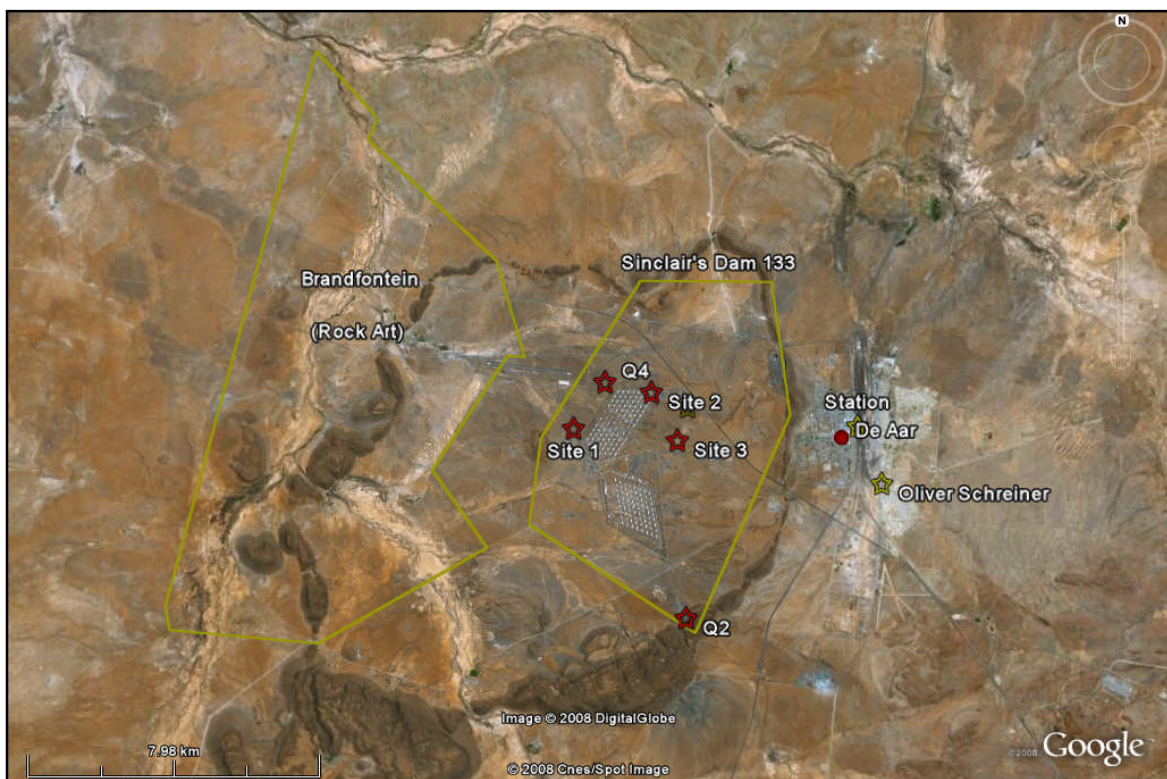


Figure 18: Archaeological scoping of the Sinclair's Dam 133 development area and immediate surrounds

Archaeological scoping for the proposed establishment of an Ammunition Disposal Plant to be located on Sinclair's Dam 133, De Aar, Northern Cape, yielded a number of sites representative of varying Culture-Historic Periods and relating more specifically to the Later Stone Age and the Historical Period. Proximity of known sites to the proposed development area is indicative of potential anthropic sensitivity.

1. No archaeological or cultural heritage resources of significance, as defined and protected by the NHRA 1999, were identified on any of the 3 proposed ADP development sites (Sites 1-3):
 - o Low densities of Stone Age lithic artefacts were present at the Site 1 and Site 2 locales. Both occurrences are assigned a SAHRA *Low Significance* and a *Generally Protected C* field rating.
 - o The proposed Site 3 locality is characterized by contemporary DoD infrastructure, post-dating 60 years of age and not formally protected under the NHRA.
2. Two quarry sites proposed for use during the construction phase of the ADP development were briefly visited; it is not envisaged that development impact at either of the sites will negatively impact on any archaeological or cultural heritage resources.
3. One known contemporary gravesite is located on Sinclair's Dam 133. Current conservation measures comply with SAHRA minimum site conservation standards.

Despite established cultural heritage sensitivity in the general area of the proposed ADP development the current proposed layout seem to be of low archaeological and cultural heritage impact.

UPON FINALIZATION OF THE ADP DEVELOPMENT LAYOUT, INCLUDING THE ADP FACTORY SITE, QUARRIES, THE WASTE DISPOSAL SITE(S), CONSTRUCTION CAMP(S) AND POST CONSTRUCTION ACCOMMODATION SITES, IF APPLICABLE, AND ALL ASSOCIATED LINEAR DEVELOPMENT AREAS AS PRESCRIBED IN SECTION 38.1 OF THE NHRA 1999, THE ADP DEVELOPMENT AREA OF IMPACT SHOULD BE SUBJECTED TO A PHASE 1 ARCHAEOLOGICAL IMPACT ASSESSMENT (AIA). RECOMMENDATIONS AS PER THE SAHRA COMMENT ON THE PHASE 1 AIA SHOULD BE COMPLIED WITH PRIOR TO DEVELOPMENT.

NATIONAL HERITAGE RESOURCES ACT, ACT NR 25 OF 1999

HERITAGE RESOURCES MANAGEMENT: Section 38

- 1) Subject to the provisions of subsections 7), 8) and 9), any person who intends to undertake a development categorized as -
- a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
 - b) the construction of a bridge or similar structure exceeding 50 m in length;
 - c) any development or other activity which will change the character of a site -
 - i. exceeding 5 000 m² in extent; or
 - ii. involving three or more existing erven or subdivisions thereof; or
 - iii. involving three or more erven or subdivisions thereof which have been consolidated within the past five years; or
 - iv. the costs which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
 - d) the rezoning of a site exceeding 10 000 m² in extent; or
 - e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority, must at the very earliest stages of initiating such a development, notify the responsible heritage resources authority and furnish it with details regarding the location, nature and extent of the proposed development.

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