

Archaeological Heritage Survey

**Buffelsfontein 435, parts of Portions 2, 17 and 23,
Albertinia, Hessequa Municipality, Western Cape
Province**

by

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Executive Summary

This investigation found heritage in the two study areas that is protected under the National Heritage Resources Act of 1999.

Heritage occurrences noted are:

- *two partly buried features, possibly built by humans with packed stone (LSA or Historical) – these could be grave coverings*
- *two associated ca. 1940s graves (relatives of neighbouring farmer)*
- *one now vacant farm house, dating from the 1930s at a minimum*
- *very extensive (near study area wide in distribution) but mostly dispersed and derived scatters of stone tools from the Early Stone Age (ca. 1 million to 300,000 years ago) and / or the Middle Stone Age (300,000 to 30,000 years ago) that very likely are in part buried*
- *a highly ephemeral scatter of Later Stone Age (last 30,000 years) stone tools located on aeolian sand next to a seasonal stream*
- *at least two prominent outcrops of silcrete used as a source of raw materials for stone tool production, one of which exhibits evidence of intensive use.*

This report argues that the scatters of stone tools are not of great importance as sources of historical information.

The house and graves should not be disturbed in any manner by the proposed mining, unless compelling reasons exist for doing otherwise and permits are issued by the relevant authorities.

The two stone features are of significance as possible indigenous grave coverings until proven otherwise.

The intensively used silcrete outcrop is of local and regional significance as such localities were used throughout human history of the area and are not well-documented.

Consequently, it is recommended:

1. *that there be no further legally obligated mitigation of heritage issues concerning the stone artefacts scatters that cover most of the study areas and that the developer apply for and be granted a permit for the destruction of these resources;*
2. *that the house and associated graves be protected in a legally enforceable manner to the satisfaction of the heritage authorities. In the event that the development will disturb the graves, the developer must implement the legally mandated steps with regards to the exhumation and relocation of the graves in consultation with the South African Heritage Resources Agency;*
3. *that the developer commission a professional archaeologist to conduct exploratory clearing of the stone features. If determined as human burials, the matter will fall into the domain of the South African Heritage Resources Agency and require a professional archaeologist to undertake the mitigation under permit;and*
4. *that the developer formally exclude the well-used silcrete outcrop from development in a manner satisfactory to the heritage authorities. If this is not feasible, the developer must commission a professional archaeologist to conduct exploratory shovel testing in the area of the outcrop and a detailed study of the occurrence so as to formulate appropriate measures to mitigate the impacts of the proposed development on the resource. This step will inevitably incur further costs with regard to the mitigation and could lead to a recommendation to conserve the outcrop in perpetuity.*

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1. Introduction

1.1 Background

Pro-Earth appointed CHARM to undertake a Archaeological Heritage Impact Assessment (AIA) of parts of Portions 2, 17 and 23 of Buffelsfontein 435, Albertinia in the the Hessequa Municipality, Western Cape Province (refer to Figure 1). Prospecting has revealed extensive deposits of Ball Clay of Tertiary Age and a mine is proposed to exploit this resource. The potential developers have identified two separate areas for exploitation, termed here Mining Area 1 (MA1) and Mining Area 2 (MA2) respectively.

1.2. Purpose and Scope of the Study

The objectives of the AIA are:

- to assess the study area for evidence of archaeological and other heritage materials as protected under the provisions of the in terms of the National Heritage Resources Act , No. 25 of 1999 (NHRA of 1999);
- to evaluate the significance of archaeological materials in the study area;
- to assess the significance of the impact of the proposed development on archaeological resources;
- if necessary, to recommend measures in mitigation of the impacts of the proposed development on the archaeological resources and
- to prepare and submit a report to the client that meets standards required by Heritage Western Cape (HWC).

1.3 Study Area

MA1 is approximately 66 hectares in extent and lies immediately north of the National Road 2 (N2) just less than a kilometre east of the small town of Albertinia. MA2 is separated from MA1 to the east by around 700 metres and is nearly 30 hectares in size (refer to Figures 1 and 2).

Farming is the principle economic use of the study areas at present, with both crop agriculture and animal husbandry. As a consequence, the areas are mostly disturbed in some manner or other, with ploughing as the principal mechanism. In addition to the farming farming, there have been instances of quarrying on both MA1 and MA2, although the scale involved is relatively small.

Geomorphologically, much of both the study areas consists of relict river terraces, with localised outcrops of ferricrete and silcrete emplaced above clays of considerable depth. A principle feature of the landscape are scatters of mostly sub-rounded alluvial cobbles of highly variable density. For the most part, the alluvium is covered by silty sands and much of the cobble material is derived at the surface by ploughing and bioturbation.

Vegetation in the areas essentially is either exotic, mono-culture or short-term regrowth. Dense stands of alien trees (*Acacia cyclops*- rooikrans) infest the courses of seasonal streams that tend to drain towards the north east. Elsewhere, isolated clusters of these as well as indigenous bushes and trees occur, often in areas not suited to ploughing such as rock outcrops.

Near boundary beacon E in MA1 there is much disturbance and a dense vegetation cover, predominantly of short grass. Visibility here is poor for the most part. Along this southern boundary midway vegetation is in places impenetrable and elsewhere mostly dense low grass cover. Visibility very low but larger pieces of stone do stand out.

Very dense ankle to knee height grass blankets much of the area south-east, east and north of an old farm house located north-east of boundary beacon G in MA1. . Ground cover denies good visibility but dune molerat burrow heaps assist in sampling sediments. Sediment is far more visible 200 m north of the house, where substrate clearly is aeolian and heavily burrowed.

Visibility is variable in the region of Boundary Beacon H. Ploughed fields have low grassy growth with good visibility whilst other areas are thickly overgrown with mesems and other cover, including thickets of alien rooikrans.

The ploughed fields south of Boundary Beacon C offer good visibility for larger lithic items with dense but short grass cover that would pose problems for locating smaller artefactual items. A similar situation pertains towards Boundary Beacon A. Some thickets of rooikrans and dense knee to waist high natural vegetation occur close to Beacon A. Unconsolidated sandy sediment lies in the corner around beacon B with moderately dense knee / thigh height bushes. Visibility is good at short range and less so at distance, particularly in the natural vegetation.

The mid-western area of the MA1 study area consists mostly of open ground with thick but low grass cover in dormant ploughed fields. Visibility for small archaeological items is extremely bad but reasonably good for larger specimens, if such would occur. Where mole heaps exist, they provide a good sampling opportunity but they are sporadically distributed.

A shallow valley formed by a seasonal stream dominates the eastern half of MA1. The western side of the valley has even and moderately sloping ground, with dense low ground cover (grass) but the light grey silty sand substrate is evident. Visibility thus good for large artefacts at short and medium range and good for smaller material only at close range. Light grey unconsolidated sands lie in a narrow swathe along the west bank, presumably above cobble deposits and grey silty sands. Intensive burrowing by dune moles is evident here. Ground quite level in places and very suitable for human encampments.

The east bank of the seasonal water course very different to west. A compact grey brown silty sand is littered with angular quartz, silcrete / quartzite and ferricrete debris in an area down slope of an intact silcrete outcrop. A recently ploughed field forms the eastern boundary of the study area with, at the time of study, a dense knee high regrowth obscuring the ground beyond short range. The ground slopes moderately down to the north.

The eastern end of the MA2 study area (Boundary Beacons B & C) consists of a strip of quite dense natural vegetation with ankle to thigh high grasses interspersed with higher bushes. Visibility is good at short range, less so at medium to long range. Well-ploughed cobble strewn areas lie to the west and to the south.

Deeply ploughed, unconsolidated yellow brown silty sand occurs along the northern boundary between Boundary Beacons A and B. Alluvial material is variable in occurrence – some places have very little, in others it is quite densely scattered. The ground steepens towards Boundary Beacon A, with the high ground to the south (Boundary Beacon F) being formed by at least two *in-situ* silcrete outcrops.

Vegetation in the west is natural (but disturbed in places) and dense stands of rooikrans choke the drainage course. Patches of sand between knee high bushes and grass grant reasonable visibility at short range. Vegetation is markedly less disturbed and thicker upslope towards.

1.4 Approach to the Study

The client provided the coordinates of the boundary beacons of each proposed Mining Area, which CHARM then loaded into a Garmin etrex hand held GPS receivers. These instruments provide the navigation necessary to remain within the study area as well as a positional record of both the observations as well as the walk paths of each searcher.

CHARM undertook fieldwork in 2 phases in July and September 2007. The study area was accessed and inspected on foot and by vehicle by either one of the authors of this report (both qualified archaeologists) and Ms Kate Collier (trainee). We searched for evidence of archaeological materials ranging in age from the Early Stone Age (beginning locally ca. 1.0 million years ago) up until 100 years ago (60 in the case of buildings). Searchers walked separate paths, paying particular attention to the relatively flat areas of the landscape as well as areas of aeolian sand that experience elsewhere shows were frequently utilised by people in the past. In addition, we paid careful attention to those few unploughed patches that exist,

given that recent human activity has had substantially less impact in these areas and traces should have survived better.

Records of the search include GPS walk trails of each searcher, an assessment of the viability of the survey with respect to visibility (principally mediated by vegetation cover), notes on the materials found and the context (observations made only by the authors), a GPS fix on each observation and digital photography (a comprehensive photographic record is available from CHARM).

Any archaeological heritage located during the survey was assessed in terms of its significance and scale of importance as well as in terms of the potential impacts of the proposed development, both without and with the implementation of measures in mitigation.

The survey methods employed in this study are standard to archaeology the world over. If conducted diligently and under reasonable conditions for the search, the results should be a comprehensive characterisation of surface traces of archaeological heritage and will provide a means of satisfying the requirements of the NHRA of 1999.

Given the situation in the study area regarding visibility, the authors of this report assess that the survey captured robust information on the nature of the archaeological heritage present. The survey will inevitably have overlooked isolated instances such as particular stone tools and stone features but that is an inevitable outcome of the methods currently employed for AIAs and accepted by HWC.

As far as the author is aware, no archaeologist has worked previously in the immediate vicinity of the proposed clay mines.

2. Results

Figure 2 presents the GPS walking trails of the survey and the location of observations. Table 1 summarises the techno-typological sub-stages of human history represented in each case. Table 4 in the Appendix provides the details of each observation as well as the projected coordinates.

Table 1: Summary of observations recorded in the study areas (Tertiary = ca. 64 million to 1.8 million years ago; ESA = Early Stone Age dating from (locally) ca. 1 million to ca. 300,000 years ago; MSA = Middle Stone Age dating from ca. 300,000 to ca. 30,000 years ago; LSA = Late Stone Age dating from ca. 30,000 until ca. 300 years ago)

Observation	Type	Material	Sub-stage
34/181, 43, 44, 53, 73, 74, 75, 79	geological occurrence	plough piles and quarry profile through alluvium	Tertiary
197, 227, 246, 249	geological occurrence	apparently unused silcrete outcrops	Tertiary
6, 9, 10, 12, 13, 25, 37, 40, 42, 47, 49, 54, 55, 64, 65, 84, 85, 86, 89, 91, 95, 96, 98, 106, 181, 182, 198, 204, 206, 210, 213, 214, 215, 216, 217, 219, 220, 221, 222, 231, 232, 234, 236, 248	archaeological	scatter of stone tools of highly variable density, mostly in association with alluvial cobbles	ESA
3, 4, 14, 38, 50, 56, 58, 59, 66, 67, 68, 69, 70, 71, 72, 76, 77, 78, 80, 81, 82, 83, 87, 88, 90, 92, 94, 97, 99, 100, 101, 102, 103, 104, 105, 199, 207, 208, 224, 225, 226, 228, 229, 233, 237, 238, 239, 241, 66KC	archaeological	scatter of stone tools of highly variable density, mostly in association with alluvial cobbles	ESA / MSA
29, 57	archaeological	indeterminate tools	ESA, MSA, LSA

Observation	Type	Material	Sub-stage
189, 240, 242	archaeological	silcrete raw material quarry	ESA, MSA, LSA
46, 48, 62, 63, 247	archaeological	dispersed stone tools, mostly in association with alluvial cobbles	MSA
24, 93, 183, 185, 186, 187, 202, 203	archaeological	dispersed stone tools, mostly in association with aeolian sand substrate and revealed in mole heaps	LSA
16, 21, 23, 30, 245	archaeological	stone and / or brick built structures, graves	Historical
184, 212	archaeological	stone features	LSA?, Historical?, Recent?
2, 60	archaeological	loading ramp, stone feature	Recent?

The following paragraphs summarises the most important details of the observations. Table 5 appended to this document provides details of each individual observation.

Observations on plough piles and quarry profile through alluvium:

Various plough piles scattered throughout the study areas (not all were noted down) provide a record of sources of raw materials available for the production of stone tools. Two sources are evident in these piles: alluvial cobbles and fragments of silcrete “rafts”. Both quartzite and silcrete cobbles occur and evidence for use of this source is available throughout the study areas (and further afield) in the form of flaked cobbles. It is worth noting that many of the plough piles also contain stone artefacts but we did not record these as adequate numbers remain in the fields.

A 4 m deep profile exposed in the side of a disused quarry shows about a metre of clast supported alluvial cobbles and gravels lying above weathered rock and clay. The interface between alluvium and clay is undulating and moderately distinct. Clasts are predominantly sub-rounded and poorly sorted. In the western part of the profile around 0.3 m of dark grey clay lies above the alluvium; elsewhere it may be removed by quarrying / grading. Significantly, we located a 30-40cm slab of silcrete used as a core and a quartzite prepared core embedded in the dark clay and resting on the surface of the river gravels. This exposure provides the best evidence for the context of ESA stone tools as being below the present-day surface and in close association with alluvial sediment beds. If true throughout, then the artefacts seen within ploughed fields essentially are derived from below.

Observations on scatters of stone tools of highly variable density, mostly in association with alluvial cobbles:

Stone tools are found throughout the field systems that characterise both the study areas (refer to Figure 3). The density in which the tools occur varies a great deal; in some areas, principally within the central area of MA1, tools are isolated or widely dispersed occurrences, whilst elsewhere one can describe the occurrences as low density scatters. Overall, the prevalence of stone artefacts is higher in MA2 than in MA1. We did not find any occurrence that was sufficiently discrete to deserve being termed “a site”.

The majority of stone artefacts seen in the research areas date to the Early Stone Age (ESA) sub-stage of human history. Key markers of this era are the handaxe (refer to Figure 4) and cleaver, two large presumably hand-held tools made by flaking. Neither of these are common in the study areas but their presence on alluvial terraces is not surprising as that is a common context throughout Africa. Many of the observations made here are denoted as ESA / MSA as other than in the case of handaxes and cleavers, some aspects of the technology of the early stages of the Middle Stone Age (MSA) are shared with that of the ESA and one cannot

necessarily distinguish between the two or discount the additional presence of MSA tools when confronted by small sample sizes at each observation point. It is our impression however, that decisively MSA tools are very uncommon in the open ground stone tool scatters in both study areas.

Aside of a higher density of stone tools (refer to Figure 5), another feature of MA2 that is worthy of note is the presence of unworked silcrete in amongst the tools (refer to Figure 6). In MA1, some of the associated cobbles are probably silcrete (distinguishing between quartzite and silcrete in a patinated / weathered state is not easy) and, whereas this is likely also true in MA2, the noted silcrete in the latter area was either angular or had a distinct globular or organic-like form. This feature of MA2 is readily explained by observations presented below of utilised outcrops of fine-grained silcrete.

Owing the greater quantities of tools, MA2 also presented evidence for variations in space in the raw materials used for tool production. Observations 213 to 216 for example, clustered in the south east corner all related to artefactual pieces made of a distinctive light grey quartzite. The yellow brown silcrete / quartzites noted commonly to the north west in MA2 were not readily in evidence in the south east.

We did not survey adjacent property but general archaeological experience and the disposition of materials within the study areas supports a conclusion that the stone artefact scatters are part of a heritage resource distributed at the scale of the local landscape. In other words, there will be a few square kilometres of relatively similar materials. Again invoking general archaeological experience in the Western Cape Province, it is clear that the materials in the study area are not notable in terms of quantity, even though some good examples of technology are present.

Observations from the quarry profile noted above suggest that the ESA stone tools may be buried and this allows that better materials may be present than the surface traces indicate. This may be true but current Archaeological Impact Assessment (AIA) methodologies for work outside of the coastal margins do not provide for mandatory invasive testing. Such an implementation would require an appropriate directive from the Provincial Heritage Authority.

Irrespective of richness in numbers and quality, all stone artefacts scatters are subject to the provisions of the NHRA of 1999 and cannot be removed, damaged, destroyed or altered without a permit from Heritage Western Cape (HWC).

Observations of dispersed stone tools, mostly in association with aeolian sand substrate and revealed in mole heaps:

Later Stone Age (LSA) are very likely under represented in the results of our survey, as the typically small size of the stone tools poses near insurmountable problems in locating thinly dispersed materials where vegetation cover is low and relatively dense or where the occupied land surface has been overturned, as is the case with ploughing. In either case, the greater the quantities of tools, the greater the chances of detection.

There is a clear LSA presence in MA1, lying in a swathe of aeolian sand on the west side of a seasonal stream flowing to the north east (refer to Figure 7). It is fair to comment that we located these microlithic tools (refer to Figure 8) principally thanks to mole rat burrow mounds and that there inevitably are other LSA materials buried here. Our search intensity is high enough to warrant a conclusion that these buried materials are also thinly distributed and that a rich but hidden site is unlikely.

Given the situation described above with respect to ploughing and vegetation, it is unclear if LSA occupation truly was limited to the sandy river bank context or if our evidence is distorted.

We can provide an estimate of occupation age in the case of Observation 93, where the presence of indigenous potsherds indicates a human presence some time after 2,000 years ago when ceramic technology first entered southernmost Africa.

The LSA materials reported here are not evidently of importance. Nonetheless, they are subject to the provisions of the NHRA of 1999 and cannot be removed, damaged, destroyed or altered without a permit from HWC.

Observations of at least one silcrete raw material quarry:

Outcrops of silcrete are a feature of the landscape in the study areas and indeed, the genesis of the silcrete as a weathering product is directly related to the presence of the clays now sought in the proposed mine. Silcrete is a highly salient topic from an archaeological point of view, as it was a raw material used for the production of stone tools throughout human history in the region and people appear to have favoured it for this purpose at different times in the past.

Observation 189 marks one substantial silcrete outcrop seen in MA1, covering 160 by 50 metres in extent. The silcrete appears as boulder-like projections from the unconsolidated well-vegetated sediments and is highly variable but predominantly poor in quality from the perspective of tool making. In places it is densely conglomeratic and with voids – but finer cherty material does exist. Evidence for use of this outcrop as a quarry is not abundant, either in the form of flake scars or as debris. Observation 197 denotes another smaller outcrop that is heavily scarred by ploughing and is poor in quality. Silcrete may also be present at Observation 199 although the surface signs are of ferricrete.

A substantial outcrop of silcrete covering nearly 200 metres in length in the westernmost end of MA2 (between Observations 240 & 242) presents the most striking evidence for quarrying in the ancient past (refer to Figure 9). There is abundant evidence for use of the outcrop as a raw material source in the form of a general scatter of debris as well as numerous flake scars on the *in-situ* outcrop (refer to Figure 10). Compared to that seen in other local outcrops, some very good quality (i.e. fine-grained) material is present on this locality. Artefacts in the area consist of the local silcrete as well as other types of silcrete seen in the wider scatter to the east of the outcrop. Unconsolidated sediments around the projecting rock may cover further evidence of precolonial technology.

This outcrop is quarried in the west below a “scarp” of silcrete. In one area a large “raft” fragment of silcrete is left perched on a clay pedestal. This slab shows evidence for flaking, and judging by the state of weathering of the flake scars, this probably occurred in the ESA (refer to Figure 11).

There are plough piles as well as dumps of farming equipment and other refuse in the area.

Another elongated outcrop of silcrete lies up slope to the south (stretching between Observations 246 and 249). There is no disturbance of this outcrop and the material is well-embedded in sandy sediments and covered with thick indigenous vegetation. Evidence for use is not as clear as is the case in the outcrop down slope to the north but this may in part be due to both the vegetation and the blanketing sediments. Of great note is that the silcrete at the western end exhibited the globular or organic-like appearance (refer to Figure 12) noted in much of the scatter of natural silcrete co-occurring with ESA / MSA stone tools in the ploughed field to the north east (Observations 226, 228, 237 and 238). We cannot discount that the globular silcrete may also occur on the outcrop to the north, but the observation circumstantially links the southern outcrop to raw material use at the very least. It is likely that these outcrops preserve evidence of ESA, MSA as well as LSA activities.

The utilised silcrete outcrop is the top ranking precolonial archaeological occurrence in the two study areas. Little is known about silcrete exploitation in the Overberg region and whilst other localities similar to or even exceeding that reported very likely exist, they are essentially unknown. As an archaeological site, this outcrop is explicitly protected under the provisions of the NHRA of 1999 and cannot be removed, damaged, destroyed or altered without a permit from HWC.

Observations of stone and / or brick built structures and graves:

Observation 30 consists of a rectangular plan domestic residence that is empty but intact even if now starting to deteriorate (refer to Figure 13). We were not able to enter the building. Exfoliated plaster reveals a stone built-fabric for at least part of the structure. The roofing currently consists of “asbestos-pattern” corrugated sheeting and unless reconfigured from a steeper pitch, was never thatched. Windows are either boarded up or wood framed (with one exception of metal). The roof or trellis from the front porch is missing.

The nature of cracks in the plaster of the western end of the structure suggest that the building might be an extended or compound structure but this is speculative.

This building was the residence of the du Toit family, currently represented by Mr Malan du Toit who occupies a modern-built house 500 m to the west. Mr du Toit does not know when the house was built but his elder sister who deceased at 2 years of age in 1944 was born there. We judge the house to date from the 1930s at the very least, allowing that it could preserve an even older "core" structure.

Mr du Toit reports that his interest in renovating and utilising the structure waned upon discovery that the foundations were inadequate and that rising damp posed a problem. Consequently, this structure faces an uncertain future and could rapidly deteriorate.

Two graves with headstones (Observation 21) relate to this house (refer to Figure 14). One grave is that of a Mr J.A. van Zyl deceased in 1945 and the other that of Ms H.M. du Toit deceased in 1944.

Whilst headstones mark the graves, the locality is nearly overgrown and the graves are not very prominent as a consequence.

The final observation, again probably relating to the homestead, is at least 3 foundations of small rectangular structures – presumably workers cottages. There are located approximately 100 metres east south east of the main farm house and consist of an indentation outline in two instances and a concrete slab in another. We have no proof of age of these remains at present and an equivalence in age to the homestead is speculative.

Observation 246 is the only historical structure noted with respect to MA2 and it is not actually within the boundaries but 5 metres outside. It consists of 2.5 m high plastered historic gateposts relating to ca. 1830s farmstead Boplaas located to the south of MA2. We mention these structures because of their proximity to the study area.

As the old du Toit residence is likely older than 60 years it is subject to the provisions of the NHRA of 1999 and cannot be damaged, destroyed or altered without a permit from Heritage Western Cape (HWC). Likewise, the graves are older than 60 years and covered by the NHRA of 1999 as well as other legislation.

Observations of stone features:

We located two structures made of loose stones one in each of the study areas.

Observation 184 lies under the fringes of a large milkwood tree growing on the aeolian sands containing the dispersed LSA stone tools. The feature consists of a cluster of large stones (ferricrete, angular quartzite or silcrete, quartzite cobbles) covering ca. 1 m² (refer to Figure 15). Some of the stones are well-embedded in the sediment and this suggests that the feature may not be recent in terms of deposition. Precisely what this structure represents is an imponderable matter as it could quite as readily be nothing as it could be a precolonial grave covering. However, the nearby presence of LSA materials in the unconsolidated sand means a distinct possibility that buried human remains will occur. Professional prudence dictates that we conclude that only excavation can settle this matter.

Observation in MA2 likewise is enigmatic under surface scrutiny. As in the case of Observation 184, the feature very likely is made deliberately rather than being a natural cluster of rocks but to what purpose is unknown. At least 10 stones occur within a square metre (refer to Figure 16). A search in the surrounds did not locate other piles so we apparently are not dealing with an old fence line.

If these features date to the precolonial past they are covered by the NHRA of 1999 and if they are graves older than 60 years they are covered by that legislation as well.

3. Sources of Risk, Impact Identification and Assessment

In relation to the potential archaeological record, development of the area will entail vegetation clearance and the removal of topsoil, followed by deeply invasive removal of the clay body. Clearly, the impacts of these activities will be highly intensive and totally destructive of any archaeological heritage that may occur in the areas directly affected. In addition, the provision of supporting infrastructure such as roads and processing areas all have the potential to disturb archaeological resources as effectively as does the core activity of the development.

Table 2 presents an assessment of the impacts on heritage covered under the NHRA of 1999 in a scenario where there is no application of measures of mitigation. This assessment assumes that all of the study area will be affected equally by the proposed development.

This study concludes that of the proposed development will not have an impact of great significance on the widely distributed scatters of stone tools dating from the ESA through to the LSA. These assemblages are nowhere well enough represented to make collecting or excavation a sensible strategy for obtaining information on past human activities. In addition, similar grade and better instances of these materials are highly likely to exist on adjacent properties.

The impact of the proposed development on the silcrete outcrops used as a raw material source in the precolonial past (Observations 189, 240, 242, 246, 249) will be unacceptably high without mitigation. This impact can in any case not proceed without a permit from HWC.

The impact of the proposed development on the stone and / or brick built historical structures as well as the graves will be unacceptably high without mitigation. This impact can in any case not proceed without a permit from HWC as the building is almost certainly covered by the NHRA of 1999. Various pieces of legislation concern the graves in addition.

Given the uncertainties surrounding the stone features / possible human burials listed as Observations 184, 212 both have the possibility of being highly significant and the impact of the proposed development will be unacceptably high without mitigation.

4. Recommended Mitigation Measures

It is recommended:

1. that there be no further legally obligated mitigation of heritage issues concerning the ESA, Msa and LSA stone artefacts listed as observations 6, 9, 10, 12, 13, 25, 37, 40, 42, 47, 49, 54, 55, 64, 65, 84, 85, 86, 89, 91, 95, 96, 98, 106, 181, 182, 198, 204, 206, 210, 213, 214, 215, 216, 217, 219, 220, 221, 222, 231, 232, 234, 236, 248, 3, 4, 14, 38, 50, 56, 58, 59, 66, 67, 68, 69, 70, 71, 72, 76, 77, 78, 80, 81, 82, 83, 87, 88, 90, 92, 94, 97, 99, 100, 101, 102, 103, 104, 105, 199, 207, 208, 224, 225, 226, 228, 229, 233, 237, 238, 239, 241, 66KC, 29, 57, 46, 48, 62, 63, 247. 24, 93, 183, 185, 186, 187, 202 and 203 and that the developer apply for and be granted a permit for destruction;
2. that the house and associated graves be protected in a legally enforceable manner to the satisfaction of the heritage authorities. In the event that the development will disturb the graves, that the developer implement the legally mandated steps with regards to the exhumation and relocation of the graves in consultation with the South African Heritage Resources Agency;
3. that the developer commission a professional archaeologist to conduct a clearing of the stone features. This will entail the archaeologist obtaining a permit to conduct the work and cleaning off the covering sands until the form of the stone arrangement is clear and interpretable. Once recorded the stones should be removed and a hole dug below the stones until it is clear that nothing is to be found. If human remains appear, the matter will fall into the domain of the South African Heritage Resources Agency (Ms Mary Leslie) and require a separate permit to proceed with the removal;and
4. that the developer formally exclude the well-used silcrete outcrop from development if at all feasible.

The circumstance of the fourth recommendation requires some elaboration. Formal (i.e. legally enforceable) exclusion is offered here as mitigation as it is the only recommendation that can be made under the present state of knowledge about the silcrete raw material site that is likely to be accepted by HWC on the basis of this report. The present study provided neither adequate time nor support for the level of research needed to properly evaluate the silcrete outcrop and associated evidence of use. That requires further work. Consequently, proposing to mine clays beneath the silcrete will require the commissioning of a professional archaeologist to conduct exploratory shovel testing in the area of the outcrop and a detailed study of the occurrence so as to formulate appropriate measures to mitigate the impacts of the proposed mining. In principle, the developer must accept that this study could reveal evidence that will lead to a recommendation to HWC that the resource must be conserved rather than adequately recorded before destruction.

As is the norm for all development projects, the following undertakings also are required of the client should the development proceed:

- In the event that vegetation clearing and earthmoving activities expose unreported archaeological or palaeontological materials, such activities must be halted and HWC notified immediately.
- Unmarked human burials may occur anywhere in the landscape and are often exposed during earthmoving activities. Human remains are protected by law and, if older than 60 years, are dealt with by the State Archaeologist at the South African Heritage Resources Agency (Mrs. Mary Leslie who can be reached at 021 462 4502).

Table 3 presents an assessment of the impacts on heritage covered under the NHRA of 1999 in a scenario where there **is** application of measures of mitigation. The mitigation described above will alleviate any significant impact of the proposed development to a satisfactory extent.

Table 2: Potential impacts of the proposed development on archaeological resources without measures of mitigation

Observation	Materials	Significance	Status	Confidence	Intensity	Scale	Duration	Probability
6, 9, 10, 12, 13, 25, 37, 40, 42, 47, 49, 54, 55, 64, 65, 84, 85, 86, 89, 91, 95, 96, 98, 106, 181, 182, 198, 204, 206, 210, 213, 214, 215, 216, 217, 219, 220, 221, 222, 231, 232, 234, 236, 248, 3, 4, 14, 38, 50, 56, 58, 59, 66, 67, 68, 69, 70, 71, 72, 76, 77, 78, 80, 81, 82, 83, 87, 88, 90, 92, 94, 97, 99, 100, 101, 102, 103, 104, 105, 199, 207, 208, 224, 225, 226, 228, 229, 233, 237, 238, 239, 241, 66KC, 29,57, 46, 48, 62, 63, 247, 24, 93, 183, 185, 186, 187, 202, 203	ESA / MSA / LSA tools	Low	Negative	High	High	Local	Permanent	High
189, 240, 242, 246, 249	silcrete raw material source	High	Negative	High	High	Local to regional	Permanent	High
16, 21, 23, 30, 245	stone and / or brick built structures, graves	High	Negative	High	High	Local	Permanent	High
184, 212	Potential stone feature	Potentially high	Negative	High	High	Local to regional	Permanent	High

Table 3: Potential impacts of the proposed development on archaeological resources with measures of mitigation

Observation	Materials	Significance	Status	Confidence	Intensity	Scale	Duration	Probability
6, 9, 10, 12, 13, 25, 37, 40, 42, 47, 49, 54, 55, 64, 65, 84, 85, 86, 89, 91, 95, 96, 98, 106, 181, 182, 198, 204, 206, 210, 213, 214, 215, 216, 217, 219, 220, 221, 222, 231, 232, 234, 236, 248, 3, 4, 14, 38, 50, 56, 58, 59, 66, 67, 68, 69, 70, 71, 72, 76, 77, 78, 80, 81, 82, 83, 87, 88, 90, 92, 94, 97, 99, 100, 101, 102, 103, 104, 105, 199, 207, 208, 224, 225, 226, 228, 229, 233, 237, 238, 239, 241, 66KC, 29,57, 46, 48, 62, 63, 247, 24, 93, 183, 185, 186, 187, 202, 203	ESA / MSA / LSA tools	Low	Negative	High	High	Local	Permanent	High
189, 240, 242, 246, 249	silcrete raw material source	Low	Negative	High	Low	Local	Permanent	High
16, 21, 23, 30, 245	stone and / or brick built structures, graves	Low	Negative	High	Low	Local	Permanent	High
184, 212	Potential stone feature	Low	Negative	High	Low	Local	Permanent	High

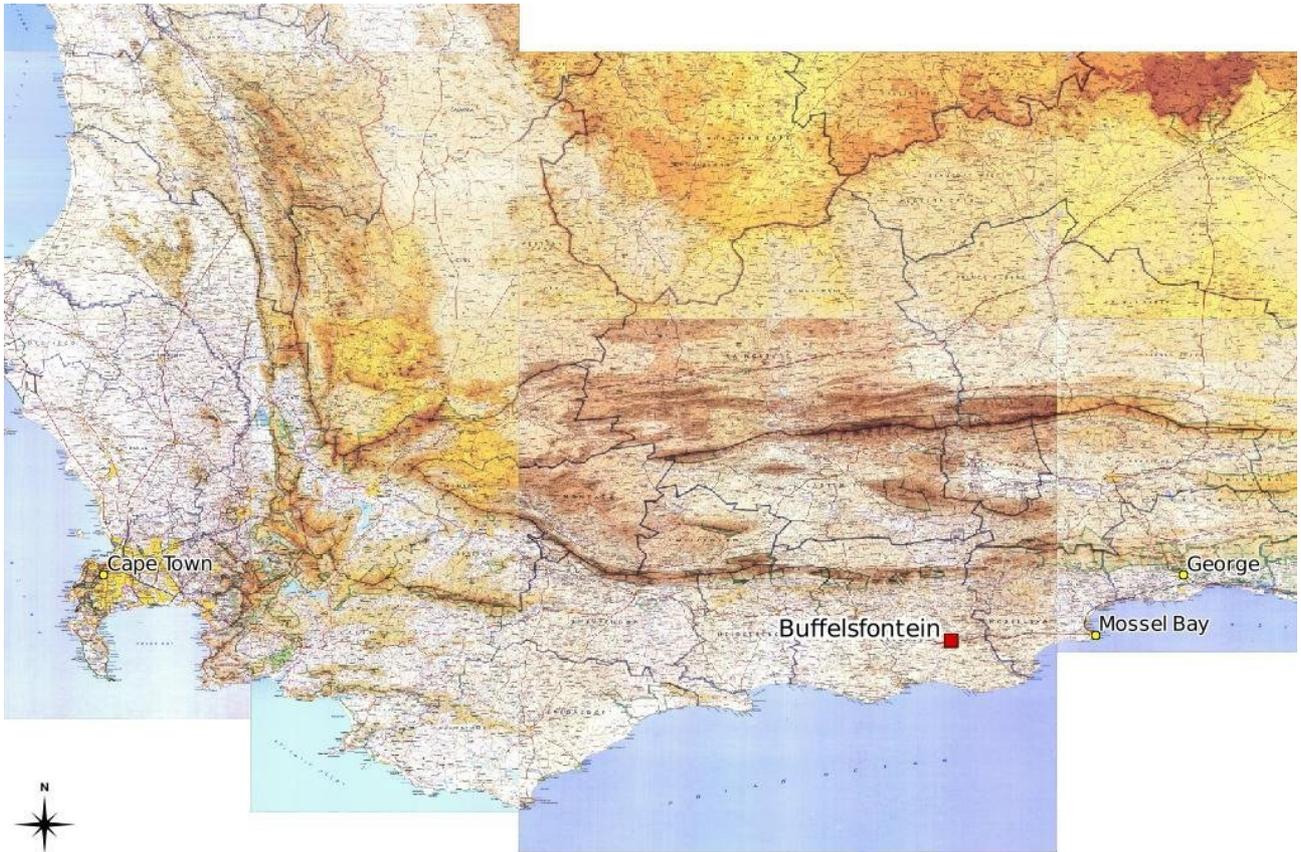


Figure 1: location of study area relative to major cities and towns

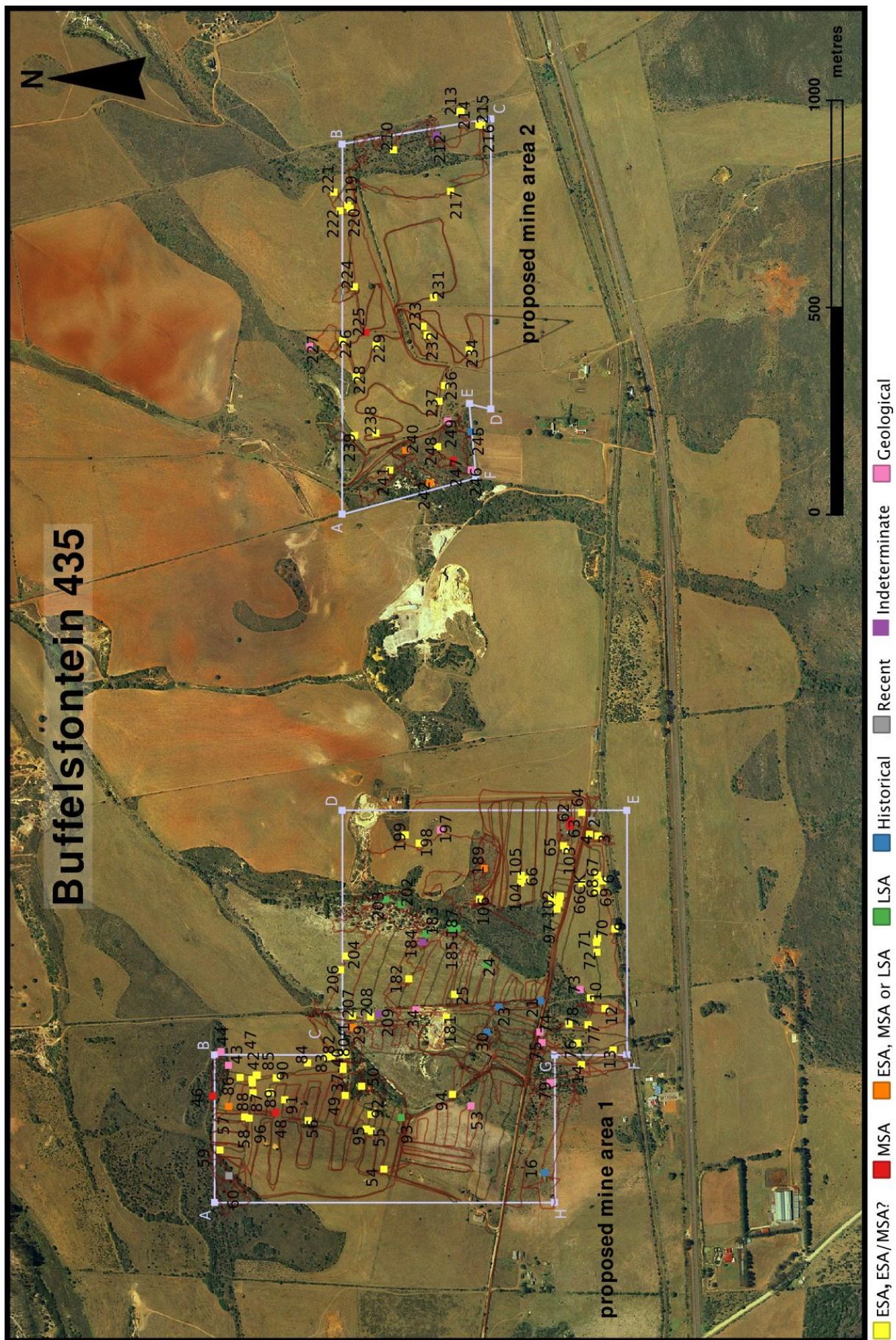


Figure 2: walkpaths and categorised observations



Figure 3: landscape of MA1, south east corner



Figure 4: superbly flaked, broken handaxe, Obs 85



Figure 5: field in MA2, Obs 232, with artefacts and unworked cobbles around the vehicle



Figure 6: collection of ESA tools, Obs 232; unworked silcrete in centre of picture



Figure 7: context of LSA tools on sand, Obs 187



Figure 8: quartz bladelet from the LSA, Obs 185



Figure 9: view of silcrete outcrop used as raw material for stone tool production, Obs 240



Figure 10: flaked silcrete outcrop, Obs 240



Figure 11: perched silcrete "raft" at edge of old quarry and flaked in the ESA, Obs 240



Figure 12: organic-like silcrete, Obs 246



Figure 13: abandoned farmhouse ca. 1930s, Obs 16



Figure 14: pair of graves ca. 1940s, Obs 21



Figure 15: packed stone feature, Obs 184



Figure 16: packed stone feature, Obs 212

Appendix

Table 4.: Detailed description of each observation in the study area along with coordinates in the South African Grid Coordinate system (datum: Hartebeesthoek94, Central Meridian: 21°E)

Obs. No	X (m)	Y (m)	Description	Stage	Comments
2	3787087	-56555.43	Plough pile of silcrete and ferricrete, with old loading ramp	Recent	
3	3787102.32	-56519.4	Artefacts present in plough piles. Bifaces, cores and flakes. Most material well-patinated. Large chunks of silcrete present as well – presumeably from a now-removed outcrop.	ESA / MSA	
4	3787082.37	-56523.21	Artefacts present in plough piles. Bifaces, cores and flakes. Most material well-patinated. Large chunks of silcrete present as well – presumeably from a now-removed outcrop.	ESA / MSA	
6	3787113.88	-56412.42	Isolated stone artefact	ESA	
9	3787142.04	-56298.89	Isolated silcrete prepared core.	ESA	
10	3787084.48	-56135.19	A few stone artefacts	ESA	
12	3787118.72	-56110.1	Low density stone tool scatter in amongst sub-rounded alluvial material.	ESA	
13	3787138.1	-56011.37	Isolated silcrete flake with edge damage	ESA	
14	3787063.57	-55976.79	Isolated silcrete flake.	ESA / MSA	
16	3786976.63	-55720.18	Partly stone built house, rectangular plan. Cement brick addition. Stone section has more recent brick-built chimney.	Historical	
21	3786966.86	-56128.52	2 graves, somewhat derelict and overgrown. Both date to ca. 1945 and relate to the old farm house.	Historical	
23	3786869.14	-56113.44	Foundations of at least 3 small rectangular structures – workers cottages? Located approximately 100 metres distant from main farm house.	Historical	
24	3786839.79	-56214.07	Isolated quartzite flake with cobble cortex – fresh scarring and indeterminate production technique. Ground sediments consist of light grey unconsolidated sand, aeolian in origin.	LSA	
25	3786765.05	-56143.55	Isolated quartzite uniface, weathered	ESA	
29	3786526.07	-56064.79	Isolated quartz flake found in burrow heap	ESA, MSA or LSA	
30	3786841.05	-56053.7	Du Toit original farmhouse predating 1940s.	Historical	Also obs 31 to 33
34	3786673.87	-56107.23	Water-filled quarry with profile through alluvial sediments and underlying clay to depth.	Geological	see obs 181
37	3786509.05	-56001.3	Silcrete core and flakes in ploughed field as well as lump of ochre.	ESA	
38	3786502.18	-55965.39	Prepared core. Nearby a large chunk of ferruginised shale (ochre).	ESA / MSA	
40	3786502.23	-55972.77	Core	ESA	
42	3786297.99	-55951.86	Large core	ESA	
43	3786232.68	-55975.29	Plough pile with ferruginised rock and silcrete, natural	Geological	
44	3786215.12	-56007.66	Plough pile with much ferruginised rock	Geological	

Obs. No	X (m)	Y (m)	Description	Stage	Comments
46	3786195.63	-55901.78	Quartz flake	MSA	
47	3786287.94	-55941.78	Silcrete prepared core	ESA	
48	3786344.05	-55863.11	Silcrete core.	MSA	
49	3786507.36	-55903.61	Silcrete core.	ESA	
50	3786546.32	-55925.5	Flake	ESA / MSA	
53	3786803.4	-55878.81	Much sub-rounded alluvial cobbles here	Geological	
54	3786598.4	-55728.87	Flake.	ESA	
55	3786568.98	-55819.37	Silcrete core.	ESA	
56	3786420.48	-55844.22	Flake	ESA / MSA	
57	3786233.21	-55877.59	Silcrete / quartzite anvil	ESA, MSA or LSA	
58	3786270.77	-55852.48	Silcrete / quartzite core on tabular piece and a silcrete prepared core.	ESA / MSA	
59	3786212.63	-55774.48	Large ?silcrete core and fine grained silcrete prepared core.	ESA / MSA	
60	3786233.34	-55713.53	Structure of rock forming oval "outline" with sunken sediment in centre.	Recent or natural?	
62	3787035.97	-56554.82	Silcrete / quartzite prepared core	MSA	
63	3787035.9	-56542.84	Silcrete / quartzite prepared core and flake in same material	MSA	
64	3787063.83	-56574.93	Large flake	ESA	
65	3787021.2	-56495.93	Core	ESA	
66	3786930.86	-56416.29	Well-rounded quartzite cobble used as hammerstone and a silcrete core on a cobble (chopper-like)	ESA / MSA	
67	3787101.37	-56426.11	stone tool	ESA / MSA	
68	3787097.84	-56408.01	stone tool	ESA / MSA	
69	3787099.88	-56389.94	stone tool	ESA / MSA	
70	3787101.33	-56275.96	stone tool	ESA / MSA	
71	3787098.77	-56266.55	stone tool	ESA / MSA	
72	3787099.96	-56243.59	stone scatter	ESA / MSA	
73	3787060.31	-56154.84	pile of stones	Geological	
74	3786965.54	-56054.3	pile of stones	Geological	
75	3786970.91	-56029.11	pile of stones	Geological	
76	3787054.16	-56027.99	Quartzite lithic	ESA / MSA	
77	3787078.91	-56071.36	Quartzite flake	ESA / MSA	
78	3787034.27	-56072.89	Quartz core	ESA / MSA	
79	3786989.92	-55934.01	pile of stones	Geological	
80	3786503.07	-56003.55	flake (PJN photo ?37?)	ESA / MSA	
81	3786499.07	-56003.31	flake	ESA / MSA	
82	3786475.54	-55997.39	flake	ESA / MSA	
83	3786466.04	-55995.52	core	ESA / MSA	

Obs. No	X (m)	Y (m)	Description	Stage	Comments
84	3786418.9	-55980.94	broken hand axe	ESA	
85	3786300.27	-55951.78	Silcrete hand axe with tip missing	ESA	
86	3786260.1	-55946.48	Silcrete prepared core	ESA	
87	3786288.88	-55933.47	Core	ESA / MSA	
88	3786290.42	-55910.14	0.5 stone tool	ESA / MSA	
89	3786330.1	-55911.05	ESA hand axe (PJM photo)	ESA	
90	3786345.19	-55945.42	flake	ESA / MSA	
91	3786365.01	-55893.59	worn ESA hand axe	ESA	
92	3786568.12	-55858.78	stone tool	ESA / MSA	
93	3786638.9	-55851.32	3 molehills with animal bones& pottery	LSA	
94	3786760.09	-55906.38	Core in driveway	ESA / MSA	
95	3786556.97	-55824.1	ESA stone artifact	ESA	
96	3786281.42	-55849.92	Silcrete cleaver	ESA	
97	3787006.45	-56345.47	Silcrete core	ESA / MSA	
98	3787010.56	-56359.7	ESA stone artifact	ESA	
99	3786994.25	-56366.43	Pile of stones - numerous ESA artefacts	ESA / MSA	
100	3786993.3	-56372.48	unusual worked stone of reddish colour	ESA / MSA	
101	3787011.59	-56370.35	stone flake	ESA / MSA	
102	3787014.01	-56376.55	stone flake	ESA / MSA	
103	3787026.31	-56487.94	stone flake	ESA / MSA	
104	3786920.85	-56407.85	MSA blade	ESA / MSA	
105	3786921.87	-56425.85	silcrete flake	ESA / MSA	
106	3786824.08	-56369.55	Quartz biface	ESA	
181	3786745.27	-56088.67	4 m profile created by small quarry, now with 1 metre of water in bottom. A lot of displaced sediments lie at the surface on the quarry edges and the profile is not obscured in places by slumping. Profile reveals alluvial cobbles and gravels of ca. 1 metre depth lying above weathered rock and clay. Interface between alluvium and clay is undulating and moderately distinct. Gravels are predominantly sub-rounded and poorly sorted. Around 0.3 m of dark grey clay lies above the alluvium in western part of the profile and may be removed elsewhere by quarrying. A slab of silcrete used as a core and a quartzite prepared core lay on the surface of the gravels within the clay matrix.	ESA	
182	3786657.13	-56180.22	Cobbles exposed on surface. Quartzite biface (tip broken). Cobble patch 30 m diameter. Cobble scatter develops into more or less continuous distribution to the east nearer the seasonal water course. Artefactual density very low.	ESA	
183	3786697.21	-56286.29	Isolated cobble fragment with hammer stone damage on cortex.	LSA?	
184	3786689.69	-56267.46	Cluster of large stones (ferricrete, angular quartzite/silcrete, quartzite cobbles) covering ca. 1 m2	LSA?, Historical?, Recent?	
185	3786758.99	-56305.61	Quartz bladelet found in moleheap; small quartzite	LSA	

Obs. No	X (m)	Y (m)	Description	Stage	Comments
			flake 1 metre away; quartz chip 4 m distant		
186	3786758.56	-56295.54	Large sub-rounded quartzite used as lower grind stone	LSA	
187	3786770.91	-56300.08	Quartz and silcrete flake. Occurrence is not dense.	LSA	
189	3786834.66	-56442.07	Outcrop of silcrete covering xx by yy. Silcrete quality highly variable but predominantly poor – conglomeratic and with voids – but finer cherty material does exist. Evidence for use as a quarry not abundant, either in the form of flake scars or as debris. Sediments have accumulated around outcrop.	Geological, ESA, MSA or LSA	
197	3786731.71	-56533.45	Small outcrop of silcrete in field exposed by plough gouges (covers 40 x 40 m). Evidence for use as a quarry not striking. Silcrete quality poor.	Geological	
198	3786681.76	-56501.92	Silcrete cleaver. Much natural rock debris on surface but artefacts are not a striking component.	ESA	
199	3786648.77	-56521.7	Outcrop of mostly ferricrete well covered by indigenous vegetation. Could be silcrete here as well. Patinated silcrete flake (see photo) but this could be derived rather than in-situ. A plough pile lies at the edge of the field and the natural vegetation	ESA / MSA	Obs 190 to 196 enclose outcrop
202	3786638.72	-56356.66	Lump of soft red ochre and nearby a fine grained silcrete flake fragment.	LSA	
203	3786602.8	-56368.42	Indeterminate quartzite flake	LSA?	
204	3786509.25	-56234.33	Large, heavily weathered quartzite flake. Cortical platform, diffuse bulb. Few artefacts in vicinity.	ESA	
206	3786496.35	-56201.85	Biface trimming flake	ESA	
207	3786524.39	-56092.48	Silcrete flake-blade – nothing seen in vicinity.	ESA / MSA	
208	3786567.03	-56090.81	Quartzite retouched flake	ESA / MSA	
209	3786586.93	-56097.1	Quartzite flake, split	Indeterminate	
210	3786621.15	-58146.58	Highly weathered probable biface fragment (butt end) in quartzite?	ESA	
212	3786721.36	-58180.15	Packed stone feature – at least 10 stones within a square metre. Not evidently a fence line pile	LSA?, Historical?, Recent?	
213	3786774.05	-58236.17	Highly weathered light grey quartzite core – negative flake scars extremely diffuse	ESA	
214	3786780.06	-58237.77	Highly weathered light grey quartzite core	ESA	
215	3786822.27	-58206.68	Large 15 cm weathered light grey quartzite flake	ESA	
216	3786828.83	-58204.56	Light grey quartzite chunk with modified convex edge	ESA	
217	3786755.28	-58048.09	Quartzite / silcrete biface – cortex on butt, orange brown colour. Other tools present in general area – flakes, flaked cobbles, well patinated.	ESA	
219	3786518.79	-58007.56	Tip of a quartzite biface. Scatter of tools in area – cores on cobbles, flakes odd retouched pieces – density 1 to 2 pieces per 15 to 25 square metres.	ESA	
220	3786513.22	-58014.99	Silcrete biface – cortical butt. High quality raw material. Density of tools around 4 pieces per 15 square metres. Both flakes and production debris as well as small flaking debris present.	ESA	
221	3786480.8	-58046.36	Artefacts present with greater density of alluvial materials.	ESA	

Obs. No	X (m)	Y (m)	Description	Stage	Comments
222	3786495.16	-58001.91	Quartzite handaxe	ESA	
224	3786528.93	-57821.87	Area of high density natural lithic material, dark reddish brown ferruginous, with associated artefacts. Most of the yellow brown patinated material is artefactual whilst no evidence for use seen on the reddish brown rock. 10 to 15 artefactual pieces per 15 square metres. Both well patinated (weathered) and relatively unpatinated pieces occur here – likely mixed age assemblage. Pieces examined: silcrete prepared core (4913); quartzite biface (4914); small and large flakes; large silcrete core (4915); intensively worked silcrete prepared core (4917); unpatinated silcrete prepared core (4918); irregular unpatinated silcrete flake blade (4919).	ESA / MSA	
225	3786555.81	-57713.61	Artefacts seen between Observation 224 and this point.	ESA / MSA	
226	3786501.02	-57694	Quartzite scraper. Great quantities of natural yellow silcrete pieces in the vicinity – much of it rounded globular or “tubule” like in appearance. Artefacts also made on the yellow silcrete. Artefacts persist in this area as elsewhere – some very weathered, others fresher in appearance, both quartzite and silcrete	ESA / MSA	
227	3786423.61	-57680.65	Outcrop of highly weathered silcrete in natural vegetation. Quality seems poor and there is little evidence for artefactual use. Does not have the globular appearance of the natural silcrete seen in the ploughed field to the south.	Geological	
228	3786533.43	-57608.27	Natural silcrete scatter continues until this point.	ESA / MSA	
229	3786580.18	-57683.33	natural silcrete has disappeared at this point on transect back to the south east.	ESA / MSA	
231	3786715.3	-57796.29	stone artefacts similar to scatters observed in Observation 217	ESA	
232	3786700.39	-57706.87	Fine-grained silcrete core (silcrete quite common – a few other cores seen). Flakes probably present in amongst thick short grass.	ESA	
233	3786690.53	-57727.87	Area with local concentration of tools including a large quartzite biface (tip broken), a large silcrete scraper, silcrete flake blade, silcrete prepared core, quartzite prepared core.	ESA / MSA	
234	3786798.97	-57671.62	Quartzite handaxe (slightly lower artefact density)	ESA	
236	3786740.86	-57587.36	Quartzite cleaver	ESA	
237	3786728.19	-57549.93	Yellow brown natural silcrete present along with many artefacts (15-20 / 15 metre square).	ESA / MSA	
238	3786579.61	-57474.84	Artefacts present – slightly lower density. Natural silcrete less common.	ESA / MSA	
239	3786529.16	-57468.73	Thin continuation of artefact scatter down into area of natural vegetation. Artefacts probably embedded / buried. A silcrete outcrop also occupies this area.	ESA / MSA	
240	3786649.86	-57433.97	Very extensive silcrete outcrop with artefacts. Artefacts both in the local silcrete and in other sorts seen in the wider scatter to the east of the outcrop. Abundant evidence for use of the outcrop as a raw material source in the pre-colonial past – debris as well as flaking of in-situ outcrop. Some very good quality (i.e. fine-grained) present compared to that seen in other local outcrops. There are plough piles as well as dumps of farming equipment and other refuse.	ESA, MSA, LSA	

Obs. No	X (m)	Y (m)	Description	Stage	Comments
241	3786612.25	-57386.82	Continuation of wider artefact scatter (silcrete and quartzite) downslope of outcrop in amongst silcrete and ferruginous rubble as well as flaking debris from outcrop. Continues down to seasonal stream gully cutting across the north-westernmost corner of study area.	ESA / MSA	
242	3786707.12	-57356.09	Outcrop partly quarried in the west below "scarp" of silcrete. In one area a large "raft" of silcrete is left perched on clay pedestal. This slab shows evidence for flaking, probably in the ESA	ESA, MSA, LSA	
245	3786804.16	-57477.85	5 m north of historic gateposts relating to ca 1830s farmstead Boplaas	Historical	
246	3786803.95	-57387.34	Westernmost extent of silcrete outcrop. Silcrete in places displays the globular appearance noted in much of the scatter of natural silcrete in the ploughed field to the east. Evidence for use not as clear as is the case in the outcrop downslope to the north.	Geological	
247	3786761.37	-57410.22	Unpatinated silcrete prepared core	MSA	Also obs 244
248	3786724.69	-57442.54	Patinated quartzite / silcrete handaxe	ESA	
249	3786748.88	-57503.33	Easternmost extent of silcrete outcrop, material well-embedded in sandy sediments.	Geological	
66KC	3787064.55	-56406.8	stone tool	ESA / MSA	duplicate number