

Phase 1 Heritage Impact Assessment for proposed new township development on the Farm Mary Ann 712, Paul Roux, Free State Province.



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Executive Summary

At the request of Phethogo Consulting a heritage impact assessment was carried out in an area marked for proposed new township development on the Farm Mary Ann 712 near Paul Roux in the Thabo Mofutsanyane District Municipality, Free State Province. The footprint is divided into three areas (Area 1, 2 and 3) in order to facilitate the evaluation.

Recommendation for Area 1: There are no major palaeontological or archaeological grounds to suspend the proposed development. Recommended Grading: **Generally Protected C (GP.C)**

Recommendation for Area 2: There is a moderate to low probability of Quaternary fossils and a high probability of intact Stone Age occurrences preserved within the alluvial overbank sediments of the Sand River. The terrain is located immediately outside the development footprint and will not be impacted by the proposed development. It is advised that the area is protected with at least a 10m buffer / no-go zone along the footprint's eastern boundary. Recommended Grading: **Generally Protected A (GP.A)**

Recommendation for Area 3: Palaeontological monitoring is recommended as part of the overall management plan for the project if excavations into sedimentary bedrock are conducted, so that potentially fossiliferous bedrock is still exposed for study and recording. However, this suggestion is subordinate to the archaeological recommendation for Area 3 and should comply accordingly. There is above-ground evidence of structures or material of cultural significance and intact archaeological sites within Area 3. It is recommended that the site is preserved. Preservation of the site will require that the area is properly demarcated with at least a 20m buffer / no-go zone along its eastern boundary. It is also advised that an archaeological management plan is included as part of the overall administration of the project in order to protect the integrity of the site during the construction as well as the operational phase of the project. Recommended Grading for palaeontology and archaeology is **Local Significance (LS) Grade 3A** and **Generally Protected A (GP.A)** respectively.

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Introduction

At the request of Phethogo Consulting a heritage impact assessment was carried out in an area marked for proposed new township development on the Farm Mary Ann 712 near Paul Roux in the Thabo Mofutsanyane District Municipality, Free State Province (**Fig. 1 & 2**). The study is required in terms of Section 38 of the National Heritage Resources Act 25 of 1999 as a prerequisite for any development which will change the character of a site exceeding 5 000 m² in extent. The task involved identification and mapping of possible heritage remains within the proposed project area, an assessment of their significance, related impact by the proposed development and recommendations for mitigation where relevant. A site visit was conducted in September 2014.

Terms of Reference

- Identify and map possible heritage sites and occurrences using available resources.
- Determine and assess the potential impacts of the proposed development on potential heritage resources;
- Recommend mitigation measures to minimize potential impacts associated with the proposed development.

Methodology

The heritage significance of the affected area was evaluated through a desktop study and carried out on the basis of existing field data, database information and published literature. This was followed by a field assessment by means of a pedestrian survey. A Garmin Etrex Vista GPS hand model (set to the WGS 84 map datum) and a digital camera were used for recording purposes. Relevant palaeontological and archaeological information, aerial photographs (Google Earth) and site records were consulted and integrated with data acquired during the on-site inspection. The study area is rated according to field rating categories as prescribed by SAHRA (**Table 1**).

Description of the Affected Area

Locality data

1 : 50 000 scale topographical map 2827 DB Paul Roux

1 : 250 000 scale geological map 2826 Winburg

Locality: Farm Mary Ann 712

General site coordinates (**Fig. 3**):

A) 28°18'23.80"S 27°56'48.68"E

B) 28°18'11.79"S 27°57'24.83"E

C) 28°19'3.88"S 27°57'44.53"E

D) 28°19'10.20"S 27°57'7.07"E

The study area is situated immediately south of the N5 national road on a floodplain next to the Sand Rivier and partly against lower mountain slopes that constitutes the western boundary of the study area (**Fig. 4 & 5**). The terrain is largely exposed to cattle grazing and other general farming activities (**Fig. 6**),

Geology

The geology of the region has been described by Nolte (1995). The area to the east of Paul Roux is underlain by sedimentary rocks of the Molteno, Elliot and Clarens Formations (Stormberg Group), with mudstones and sandstones of the older (*Trt*, Beaufort Group, Karoo Supergroup) exposed near the northwestern boundary of the study area (**Fig. 7**). Rocks of the Molteno Formation follow conformably on those of the Tarkastad Subgroup, and consist of various upward-fining sandstone units (**Fig. 8**). The overlying Elliot Formation occurs throughout the study area and consists mainly of red to purple mudstones.

Jurassic- age dolerite intrusions are common in the region with outcrop indicated south and east of the study area. A dolerite dyke bisecting the study area is indicated on the 1 : 250 000 scale geological map of the area (2826 Winburg).

The study area is for the most part underlain by younger, superficial and geologically recent sediments. Quaternary deposits in the region consist mainly of river channel alluvium, residual soils and unconsolidated scree along mountainsides. The alluvial deposits along the Sand River are mostly made up of grey and red to yellow sandy clays reaching a thickness of up to 5.0 m in places (**Fig. 9 & 10**).

Background

Palaeontology

Tarkastad Subgroup exposures in the region are generally accepted to be Early to early Middle Triassic in age of which the upper two thirds of the sequence are assigned to the *Cynognathus* Assemblage Zone (Kitching 1977; 1995) (**Fig. 11**). This AZ is characterized by the presence of the therapsids *Cynognathus*, *Diademodon*, and *Kannemeyeria*. Fossils primarily occur as in mudrock units as dispersed and isolated specimens, frequently associated with calcareous concretions. An abundance of plant fossils as well as several insect genera have been identified within the overlying Molteno Formation, but it has not as yet yielded any tetrapods. Karoo vertebrate fossil sites within 10 km from Paul Roux include the farms Uniondale 867 and Vergenoeg 1492.

Quaternary alluvial deposits found along river valleys in the north-eastern Free State, are characterized by extensive erosion in the form of dongas, and are known to occasionally contain late Pleistocene vertebrate remains and even localized death assemblages (e.g. alcelaphine remains at Heelbo near Senekal). Quaternary fossil localities within 10 km from Paul Roux include the farms Fialy 1441 and Mispah 155. There is currently no record of Quaternary-age fossils from alluvial sediments in the vicinity of the development footprint.

Archaeology

Surface scatters of Later Stone Age and Middle Stone Age artifacts are frequent archaeological components along erosional gullies (dongas) of rivers and streams in the region. The incidence of surface scatters usually decreases away from localized areas such as riverine sites and dolerite-shale contact zones. Away from riverine contexts, Stone Age artifacts generally occur as contextually derived individual finds in the open veld. Several rock art localities, containing depictions of human figures, have been recorded in the Witteberge southeast of Paul Roux. A variety of stone dagga pipes have been collected in the region, including engraved sandstone and mudstone pipes, as well as a number made of baked clay.

The archaeological footprint in the region is primarily dominated by Late Iron Age stone wall complexes (**Fig 12**). Stone enclosures found on and around dolerite

koppies along the Liebenbergvlei, Vals, and Sand River valleys between Senekal and Bethlehem, exhibit telltale signs of basic structural units including huts, large enclosures, pieces of walling and stone circles related to Late Iron Age settlements in the area. These sites were occupied from as early as the sixteenth and seventeenth centuries and represent a system that can be broadly attributed to groups ancestral to the Sotho-speaking people of today (Maggs 1976). Extensive Iron Age settlements have been recorded in the region, such as at Palmietfontein 5 and Three Sisters 1191, which are situated immediately south of the farm Mary Ann 712, where the development footprint is located.

More recent visual heritage in the area include a monument on the farm Tevrede commemorating children who died of measles during the Great Trek as well as a number of farm buildings and sites associated with the Anglo-Boer War of 1899 – 1902 (e.g. the Battle of Biddulphsberg ca.1900, about 16 km east of Senekal).

Field Assessment

The results of the foot survey are summarized in (**Table 2 & 3**). The footprint is divided into three areas (Area 1, 2 and 3) in order to facilitate the evaluation (**Fig. 13**).

Palaeontology

There is no indication of Quaternary fossil exposures within the superficial deposits capping Area 1 (**Fig. 13**). Investigation of exposed alluvial cuttings along the Sand River also shows little evidence of intact Quaternary fossil remains (**Fig. 13 & 14, Area 2**). Potentially fossil-bearing outcrop underlies the northwestern corner of the study area (**Fig. 13 & 15, Area 3**). Even though fossils are generally not evenly distributed in their occurrence, it is likely that fossils may occur within the well-exposed sedimentary bedrock underlying Area 3.

Archaeology

Area 1 consists for the most part of open veld currently used for cattle grazing (**Fig. 16**). The foot survey revealed little evidence of *in situ* Stone Age archaeological material, capped or distributed as surface scatters on the landscape. There are also no indications of rock art or prehistoric structures within the vicinity of the study area. Six sandstone fence posts were recorded flanking the western bank of the Sand River, but no other historical structures or buildings older than 60 years were found.

Two partially intact Later Stone Age sites are located within the alluvial overbank sediments of the Sand River and immediately outside the eastern boundary of the impact area (**Fig. 13, Area 2; Fig. 17 & 18**). The character and typology of the material suggest that both sites represent Holocene microlithic assemblages.

Remnants of what is possibly a complex of Iron Age middens is located near the northwestern corner of the study area (**Fig 13, Area 3; Fig. 19**). Hardly any stone structures are visible, but pottery and bone are noticeable on the surface of the terrain (**Figs. 20 - 22**). Pottery (fragments), including pieces with comb-stamped, herring-bone bands around short necks and rounded rims are present on the surface and in association with dental fragments including an upper molar of *Bos taurus*. The site falls within the distributional range of the Type V settlement pattern, a 16th or 17th to 19th century old industry, which is the most common and widely distributed Late Iron Age settlement pattern on the southern Highveld (Maggs 1976).

Impact Statement

Significance of impacts is summarized in **Table 4**

Palaeontology

Area 1

The area is underlain by Quaternary overbank sediments (alluvium) and recent residual soils. Impact on potential Quaternary fossil remains is considered low.

Area 2

The area is underlain by a thick mantle of Quaternary alluvium. The respective microlithic assemblages recorded in the alluvium almost certainly suggest a Holocene depositional age (*terminus post quem*) for the deposits. Impact on potential Quaternary fossil remains is considered low to moderate.

Area 3

Excavations resulting from the proposed development near the north-western corner of the footprint will almost certainly have an adverse affect on potentially fossil-bearing rock units. Potential negative impacts of the proposed project on the palaeontological heritage of the area may occur when trench excavations into fossil-bearing strata are required during the construction phase of the project. The proposed development is considered long term with the possible consequence that any damage or destruction to potential palaeontological material within the affected area will be permanent.

Archaeology

Area 1

The area is underlain by Quaternary overbank sediments (alluvium) and recent residual soils. The terrain is regarded as of low archaeological significance.

Area 2

The area is underlain by a thick mantle of Quaternary alluvium. Although the terrain is located outside the development footprint it is regarded as of high archaeological significance.

Area 3

Area 3 is regarded as of high archaeological significance. Conservation of the area is strongly advised.

Recommendation

Palaeontology

Area 1

There are no major palaeontological grounds to suspend the proposed development.
Recommended Grading: **Generally Protected C (GP.C)**

Area 2

There is a moderate to low probability of Quaternary fossils preserved within the alluvial overbank sediments of the Sand River. The terrain is located immediately outside the development footprint and will not be impacted by the proposed development. It is advised that the area is protected with at least a 10m buffer / no-go zone along the footprint's eastern boundary.

Recommended Grading: **Generally Protected A (GP.A)**

Area 3

Palaeontological monitoring is recommended as part of the overall management plan for the project if excavations into sedimentary bedrock are conducted, so that potentially fossiliferous bedrock is still exposed for study and recording. However, this suggestion is subordinate to the archaeological recommendation for Area 3 and should comply accordingly (see below).

Recommended Grading: **Generally Protected A (GP.A)**

Archaeology

Area 1

There are no major archaeological grounds to suspend the proposed development.

Recommended Grading: **Generally Protected C (GP.C)**.

Area 2

There is a high probability of intact Stone Age occurrences preserved within the alluvial overbank sediments of the Sand River. The terrain is located immediately outside the development footprint and will not be impacted by the proposed development. It is advised that the area is protected with at least a 10m buffer / no go zone along the footprint's eastern boundary.

Recommended Grading: **Generally Protected A (GP.A)**.

Area 3

In accordance with the types and ranges of heritage resources as outlined in Sections 34, 35 and 37 of the National Heritage Resources Act (No 25 of 1999), there is above-ground evidence of structures or material of cultural significance and intact archaeological sites within Area 3. It is recommended that the site is preserved. Preservation of the site will require that the area is properly demarcated with at least a 20m buffer / no-go zone along its eastern boundary (as indicated in Fig. 13 and Table 3). It is also advised that an archaeological management plan is included as part of the overall administration of the project in order to protect the integrity of the site during the construction as well as the operational phase of the project.

Recommended Grading: **Local Significance (LS) Grade 3A**.

References

Kitching, J.W. 1977. The distribution of Karoo Vertebrate Fauna. Bernard Price Institute for Palaeontological Research. Memoir 1, 1 – 131.

Kitching 1995. Biostratigraphy of the Dicynodon Assemblage Zone **In**. Rubidge, B. S. (ed.) *Biostratigraphy of the Beaufort Group*. Biostrat. Ser. S.Afr. Comm. Strat. 1, 1 – 45.

Maggs, T.C. 1976. *Iron Age communities of the southern Highveld*. Occasional Papers of the Natal Museum No. 2.

Nolte, C.C. 1995. The geology of the Winburg area. Geological Survey of South Africa. Council for Geoscience.

Rubidge, B. S. 1995 (Ed) *Biostratigraphy of the Beaufort Group*. Biostrat. Ser. S.Afr. Comm. Strat. 1, 1 – 46.

SAHRA, 2005. Minimum Standards for the Archaeological and the Palaeontological Components of Impact Assessment Reports.

Tables and Figures

Table 1. Field rating categories as prescribed by SAHRA (2005).

Field Rating	Grade	Significance	Mitigation
National Significance (NS)	Grade 1	-	Conservation; national site nomination
Provincial Significance (PS)	Grade 2	-	Conservation; provincial site nomination
Local Significance (LS)	Grade 3A	High significance	Conservation; mitigation not advised
Local Significance (LS)	Grade 3B	High significance	Mitigation (part of site should be retained)
Generally Protected A (GP.A)	-	High/medium significance	Mitigation before destruction
Generally Protected B (GP.B)	-	Medium significance	Recording before destruction
Generally Protected C (GP.C)	-	Low significance	Destruction

Table 2. Locality of archaeological features recorded during the foot survey.

Map Marker (Area 2 & 3, Fig. 13)	Feature	Coordinates
1	LSA Exposure	28°18'57.21"S 27°57'44.50"E
2	LSA Exposure	28°18'33.38"S 27°57'34.47"E
3	Pottery	28°18'26.81"S 27°57'1.51"E
4	Pottery and bone	28°18'28.00"S 27°57'2.16"E
5	Pottery	28°18'31.81"S 27°57'3.60"E
6	Pottery and bone	28°18'36.05"S 27°57'1.43"E
7	Pottery and bone	28°18'35.69"S 27°57'4.77"E

Table 3: Iron Age Site boundaries (Area 3)

Map marker (Fig. 13)	Coordinates
a	28°18'21.34"S 27°56'56.30"E
b	28°18'25.41"S 27°57'4.36"E
c	28°18'29.40"S 27°57'6.54"E
d	28°18'34.30"S 27°57'7.47"E
e	28°18'38.02"S 27°57'7.69"E
f	28°18'41.40"S 27°56'55.80"E

Table 4. Summary of Impacts in terms of Extent (the size of the area that will be affected by the impact), Intensity (the anticipated severity of the impact), Duration (the timeframe during which impact will be experienced), Probability of Impact, Confidence, Mitigation and Site Rating.

Impact	Area	Extent	Intensity of development	Duration	Probability of impact	Confidence	Mitigation	Rating
Impact of proposed development on palaeontology	1	Local	High	Permanent	Improbable; Unconsolidated superficial sediments	High	None	Generally Protected C (GP.C)
Impact of proposed development on archaeology	1	Local	High	Permanent	Improbable: No aboveground evidence of <i>in situ</i> features	High	None	Generally Protected C (GP.C)
Impact of proposed development on palaeontology	2	Local	Low to none	Temporary	Low - Moderate probability of Quaternary fossils preserved in alluvium near Sand River cutting	High	No-go area and buffer zone	Generally Protected A (GP.A).
Impact of proposed development on archaeology	2	Local	Low to none	Temporary	High probability of impact on intact Stone Age assemblages in alluvium near Sand River cutting	High	No-go area and buffer zone	Generally Protected A (GP.A).
Impact of proposed development on palaeontology	3	Local	High	Permanent	Moderate to High probability of impact on intact Mesozoic fossils	High	Scheduled monitoring by specialist	Generally Protected A (GP.A)

Impact of proposed development on archaeology	3	Local	High	Permanent	High probability of impact on intact Iron Age remnants	High	No-go area and buffer zone; Integrated archaeological management plan in order to protect the integrity of the site during construction as well as operational phase of the project.	Local Significance (LS) Grade 3A
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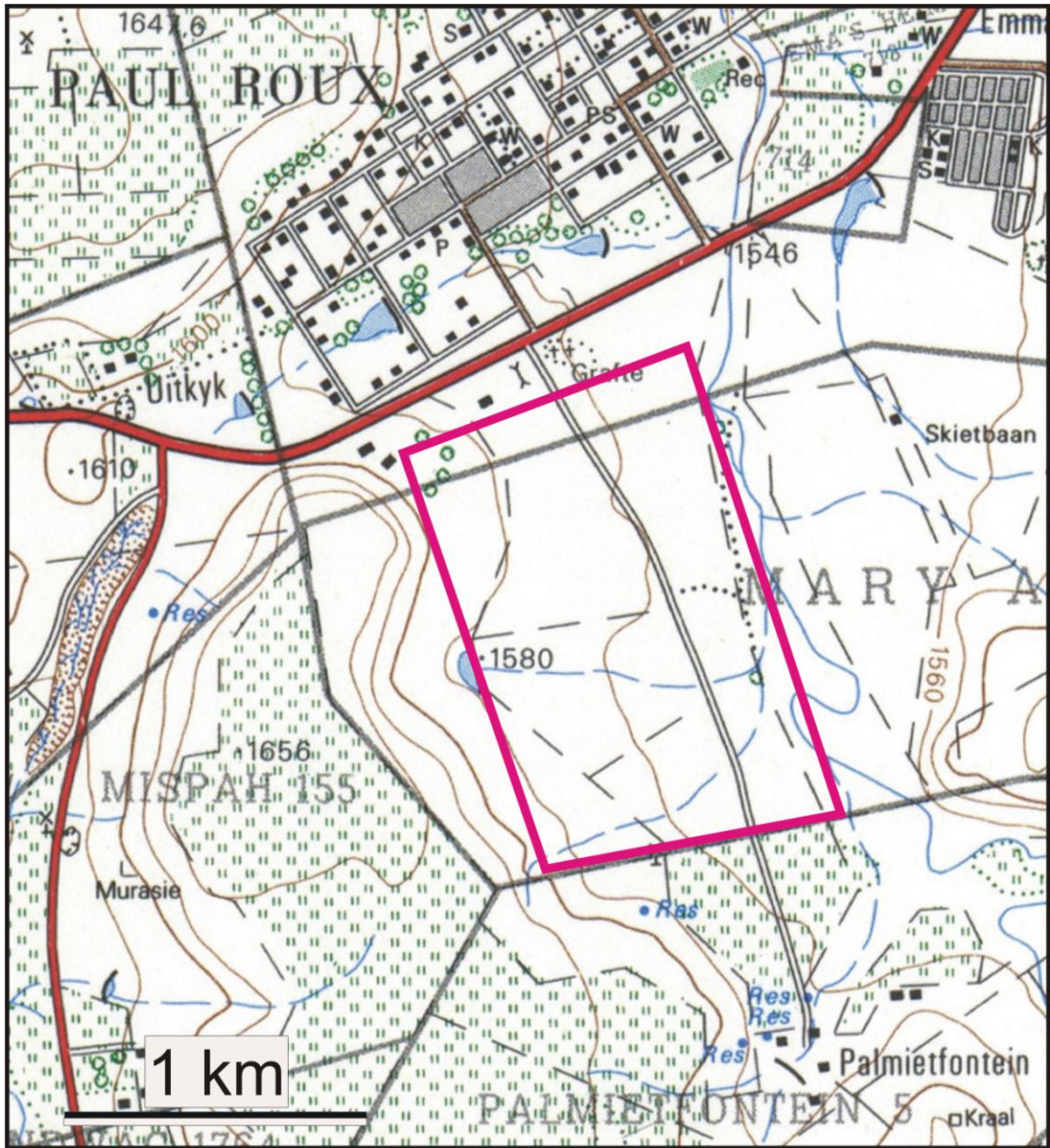


Figure 1. Map of development footprint on Farm Mary Ann 712 (portion of 1:50 000 scale topographic map 2826 Winburg).



Figure 2. Layout of the proposed development (plan provided by Phethogo Consulting).



Figure 3. Aerial view of the affected area.

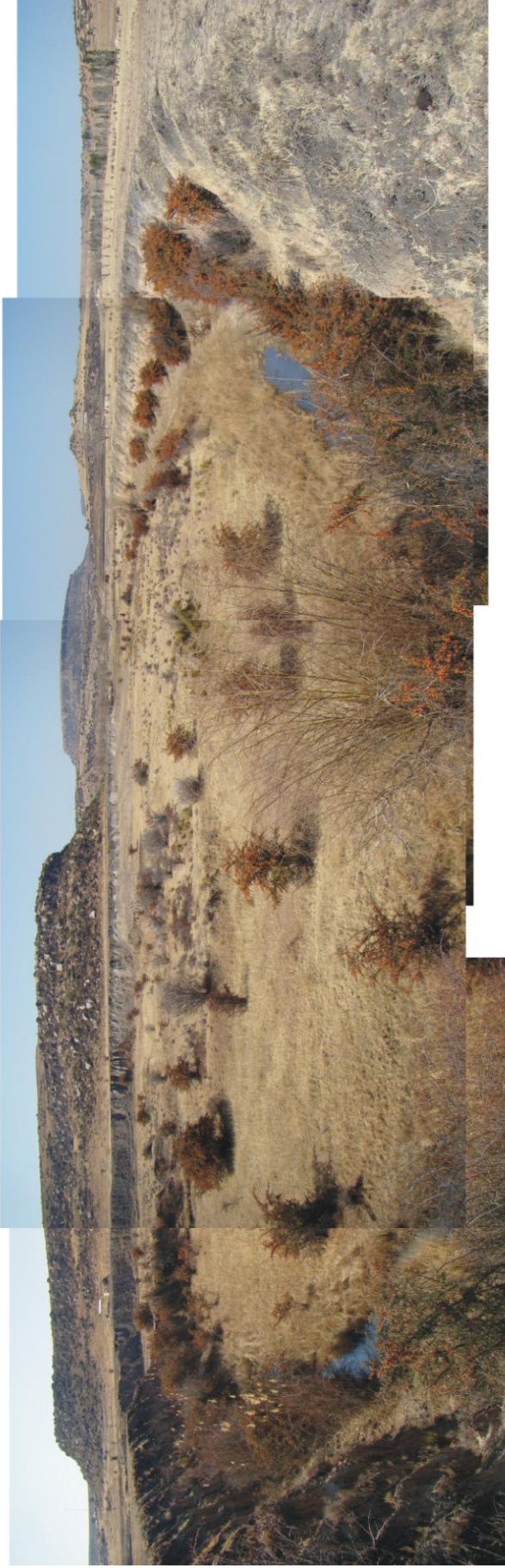
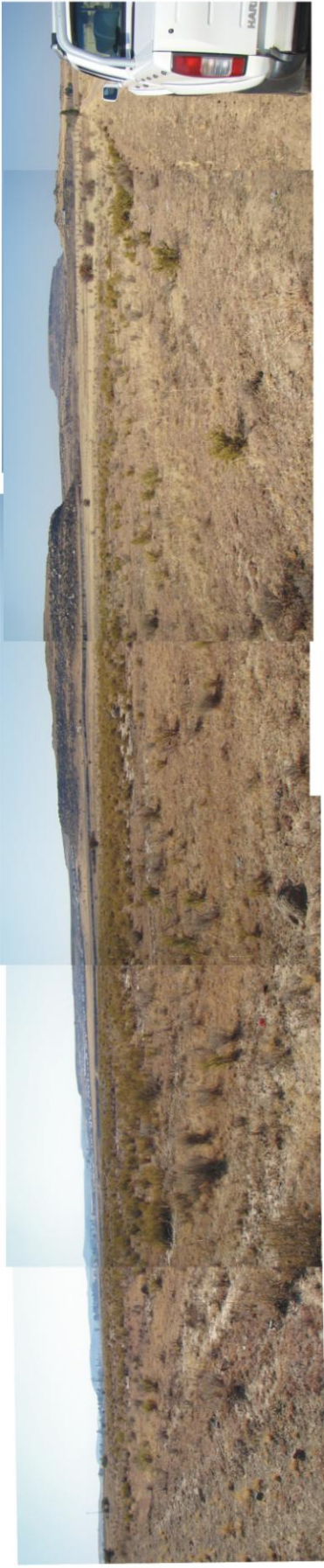


Figure 4. Panoramic view of the affected area, looking southeast towards the Sand River (above) and south at the river bed of the Sand River (below).



Figure 5. Panoramic view of the affected area, looking northwest,



Figure 6. Looking northeast towards the Sand River. The terrain is largely exposed to cattle grazing and other general farming activities.

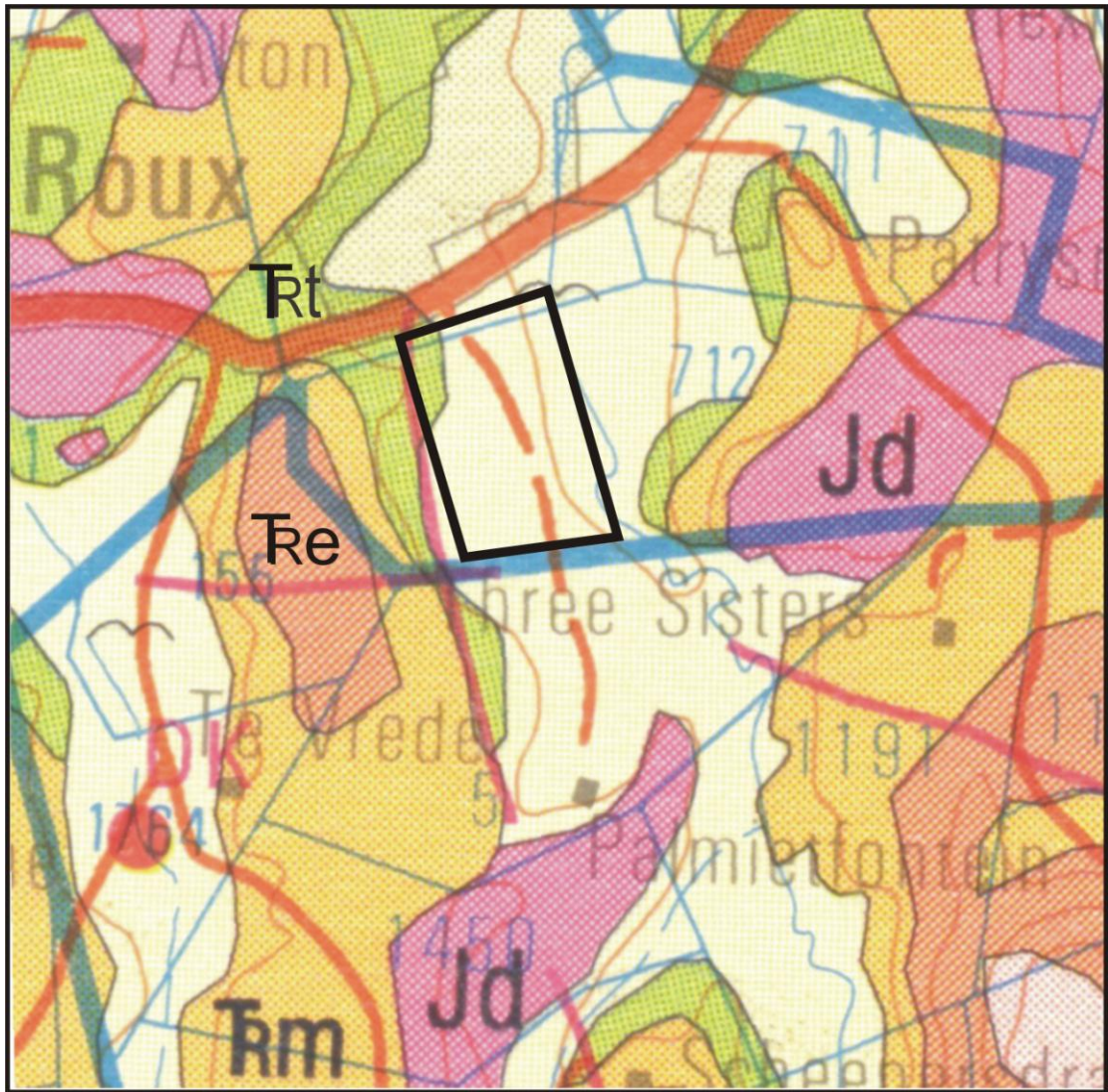


Figure 7. Portion of 1:250 000 scale geological map 2826 Winburg. The affected area is underlain by Tarkastad Subgroup strata (*Trt*) and a dolerite dyke (*Jd*), capped by superficial sediments made up of river channel alluvium, residual soils and unconsolidated scree along the mountainside along the northwestern boundary.

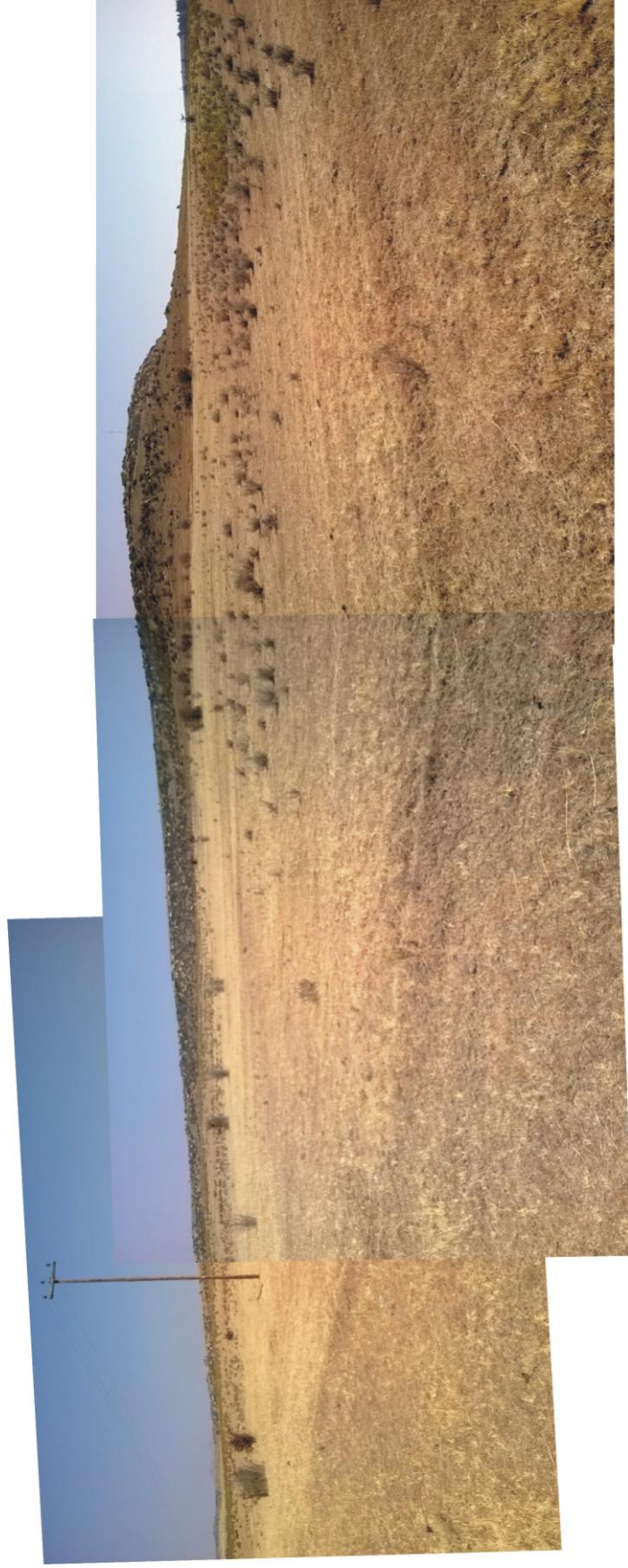


Figure 8. Looking towards the mountainside that makes up the northwestern boundary of the study area. Along this outcrop, rocks of the Molteno Formation follow conformably on those of the Tarkastad Subgroup.



Figure 9. The study area is for the most part underlain by younger, superficial and geologically recent sediments, primarily made up of river channel alluvium and residual soils.



Figure 10. The channel alluvium along the Sand River are mostly made up of grey and red to yellow sandy clays reaching a thickness of up to 5.0 m in places.

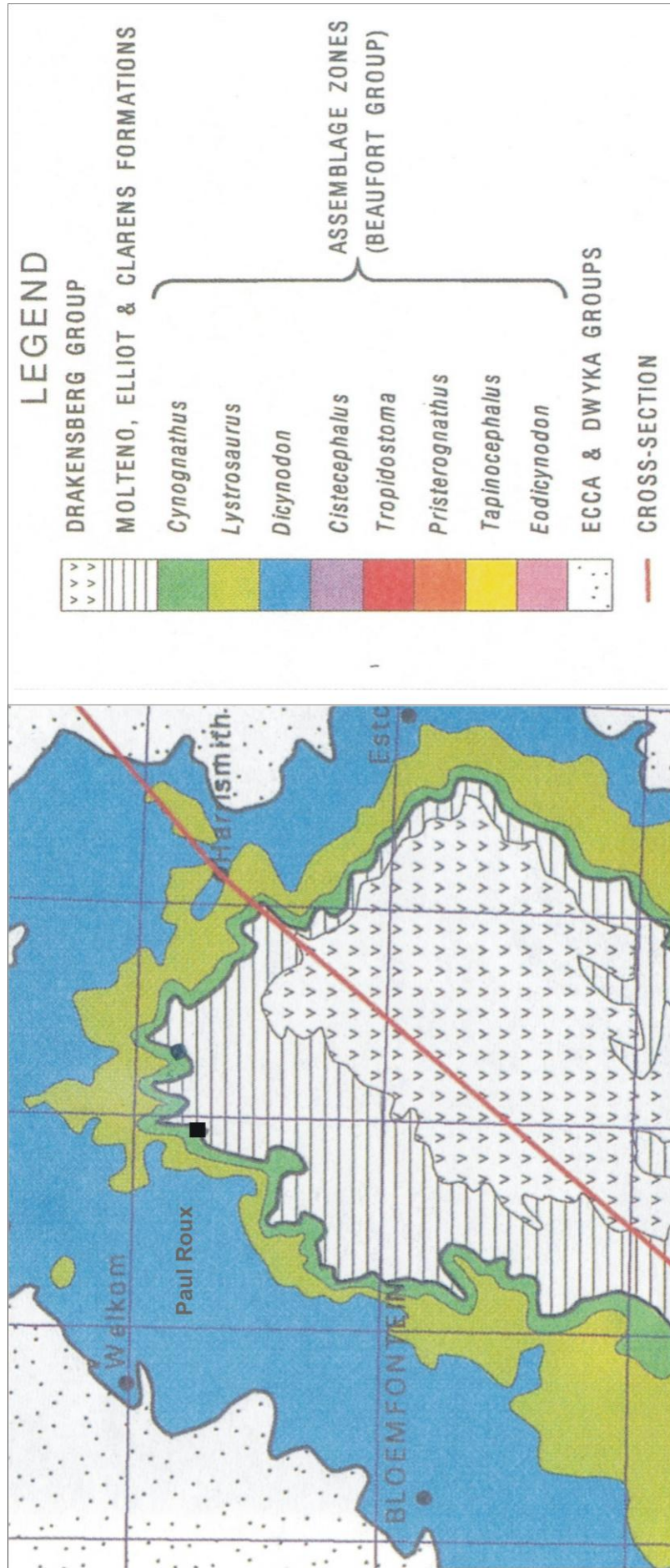


Figure 11. Geographical distribution of vertebrate biozones in the Beaufort Group (after Rubidge 1995).

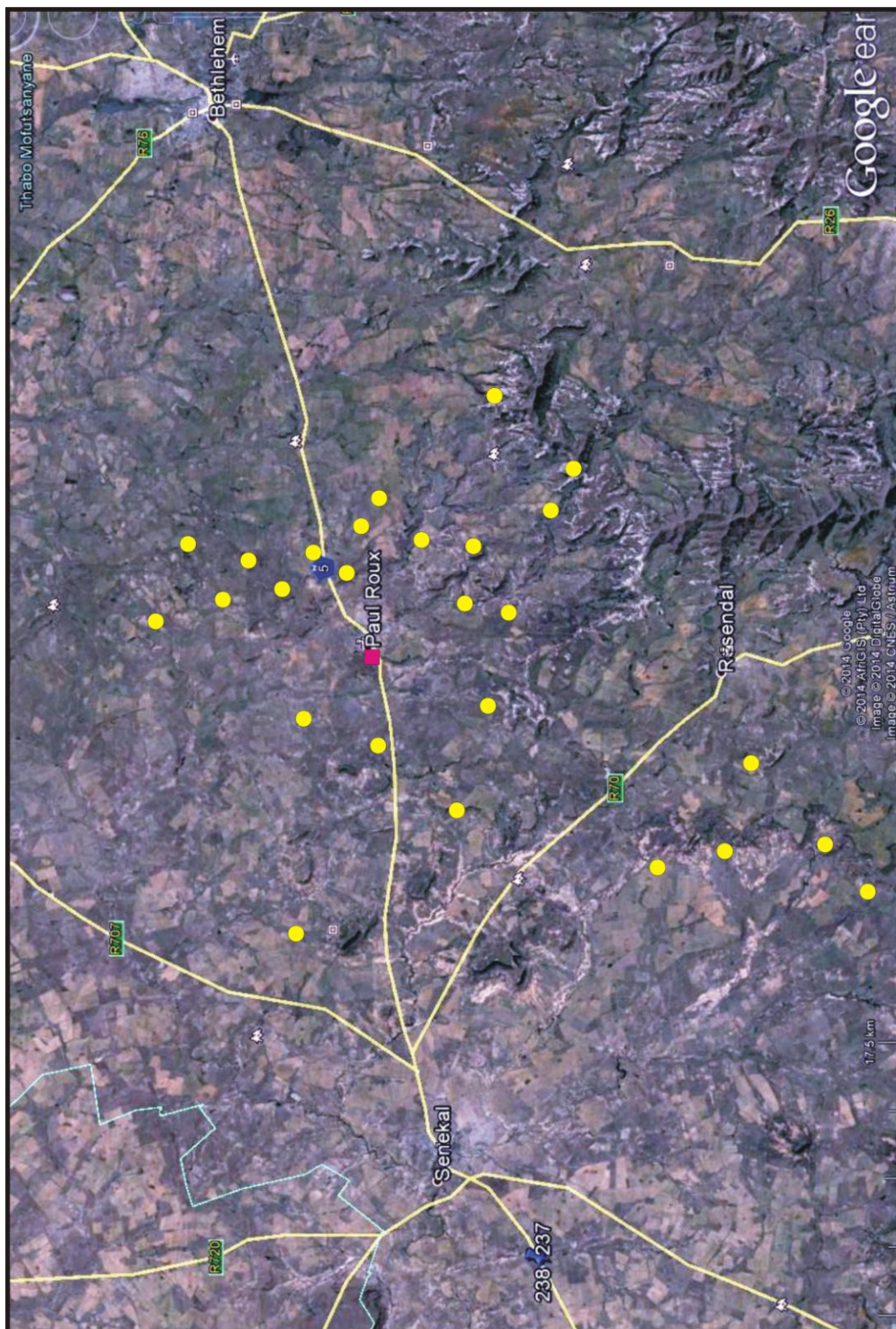
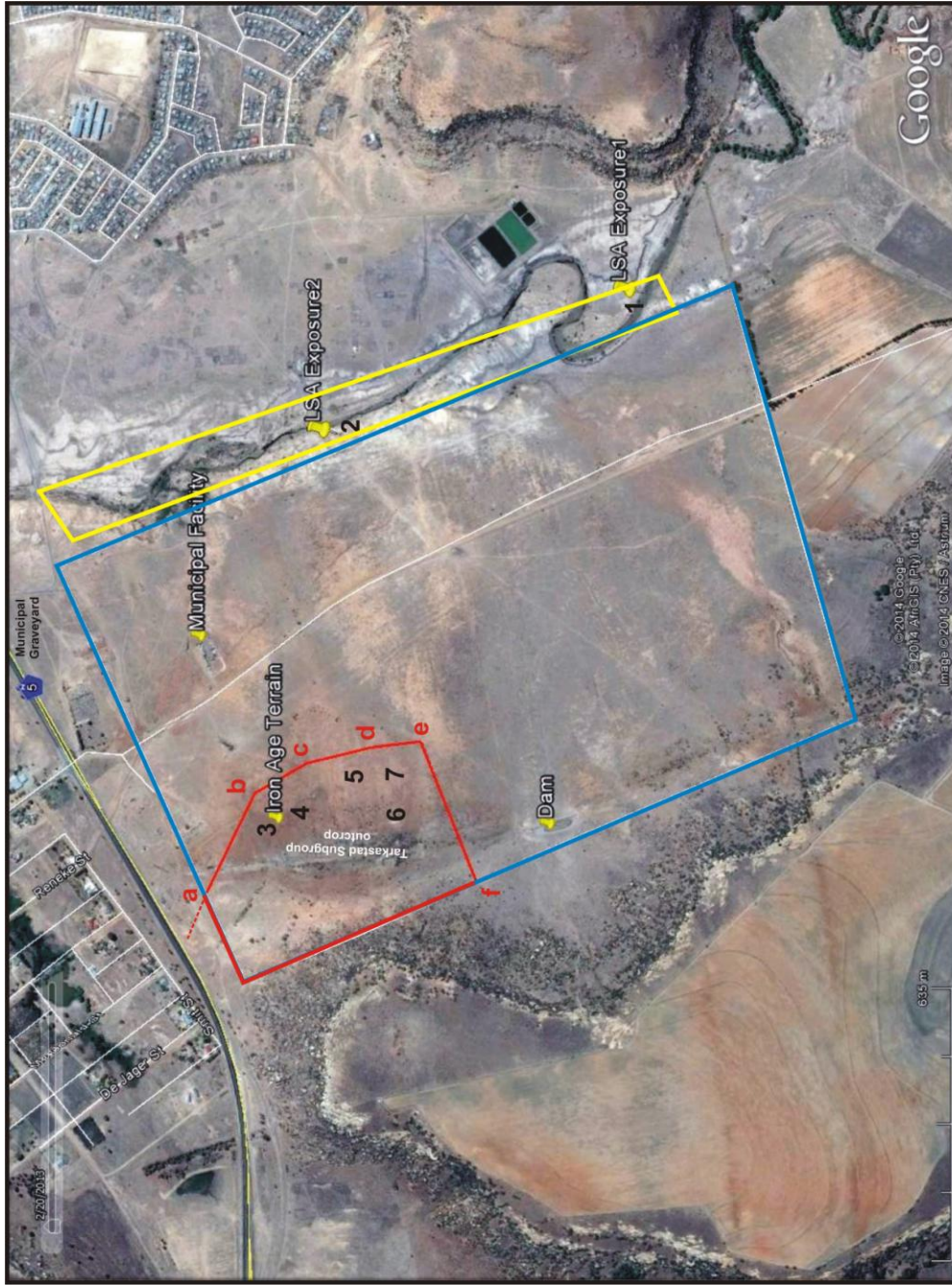


Figure 12. Distribution of Late Iron Age sites near Paul Roux (after Maggs 1976)



□ Area 3

□ Area 2

□ Area 1 (Impact Area)

Figure 13. Aerial view of the study area, divided into 3 areas (see Tables 2 & 3).



Figure 14. exposed alluvial cuttings along the Sand River.

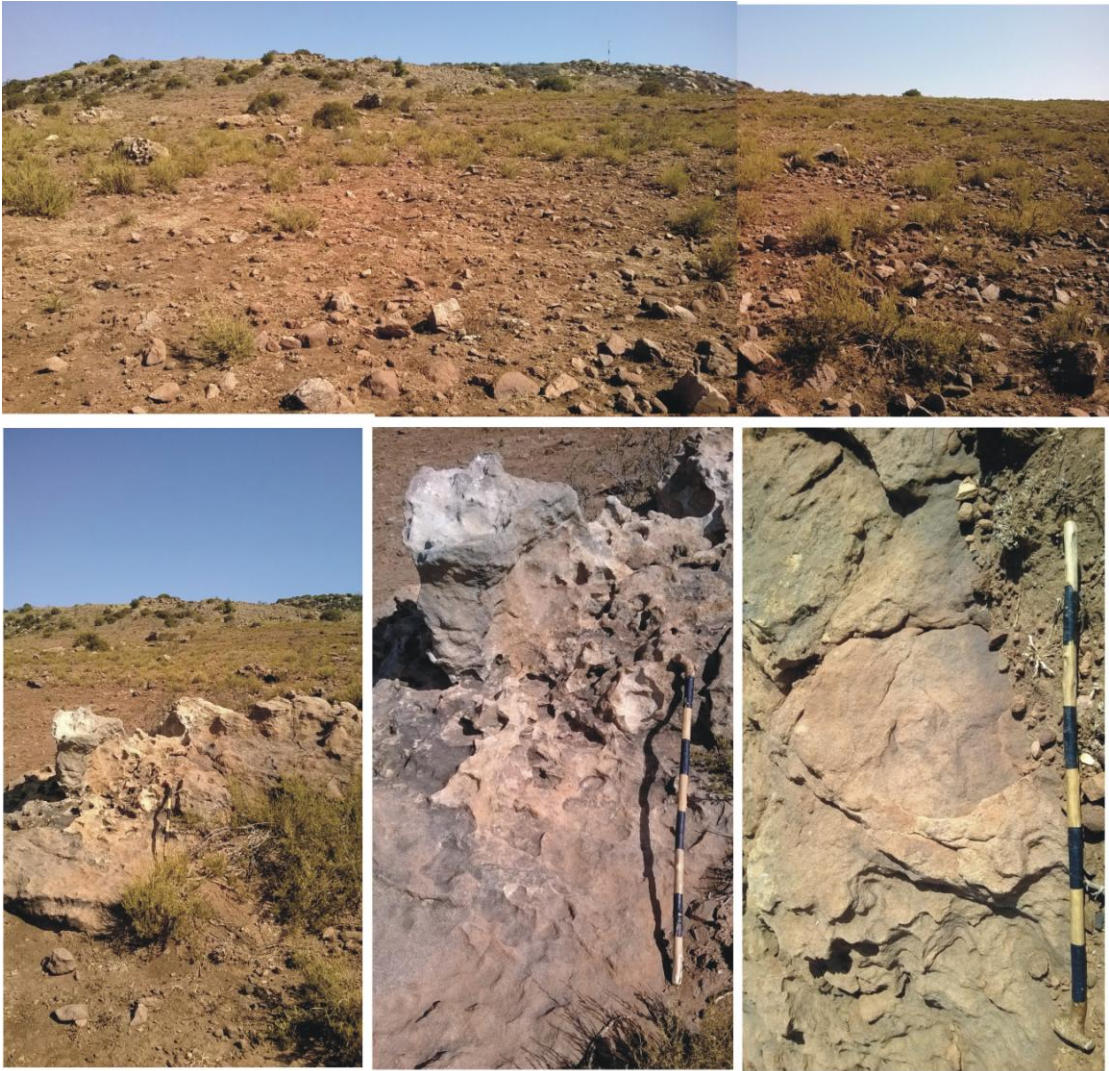


Figure 15. Potentially fossil-bearing outcrop, made up of fine to medium-grained, yellow and khaki-coloured sandstones near the northwestern corner of the study area (Area 3).



Figure 16. Area 1 consists for the most part of open veld currently used for cattle grazing. An old sandstone fence post (below).

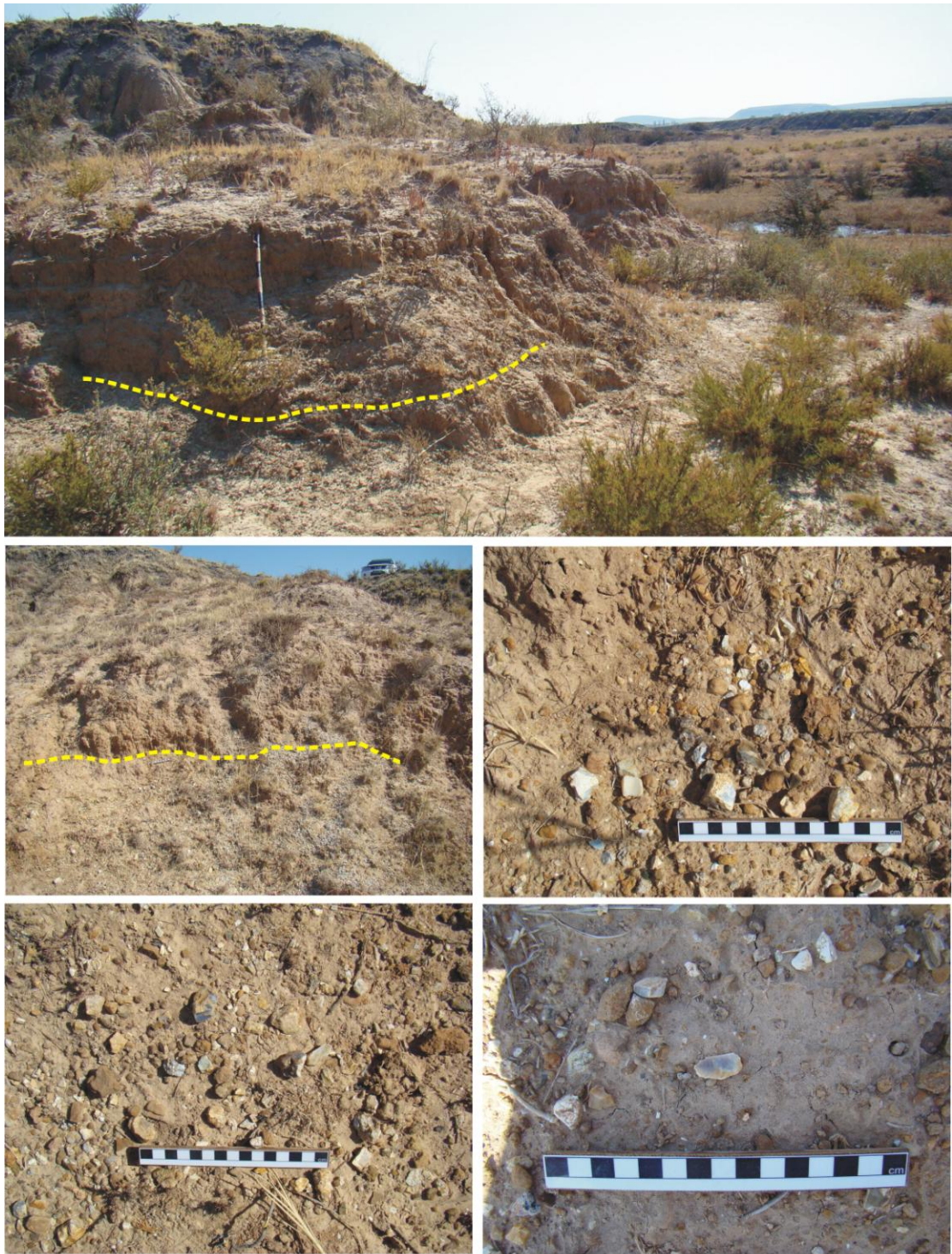


Figure 17. LSA Exposure 1 (see Table 2). A partially intact Later Stone Age site located within the alluvial overbank sediments of the Sand River and immediately outside the eastern boundary of the impact area.

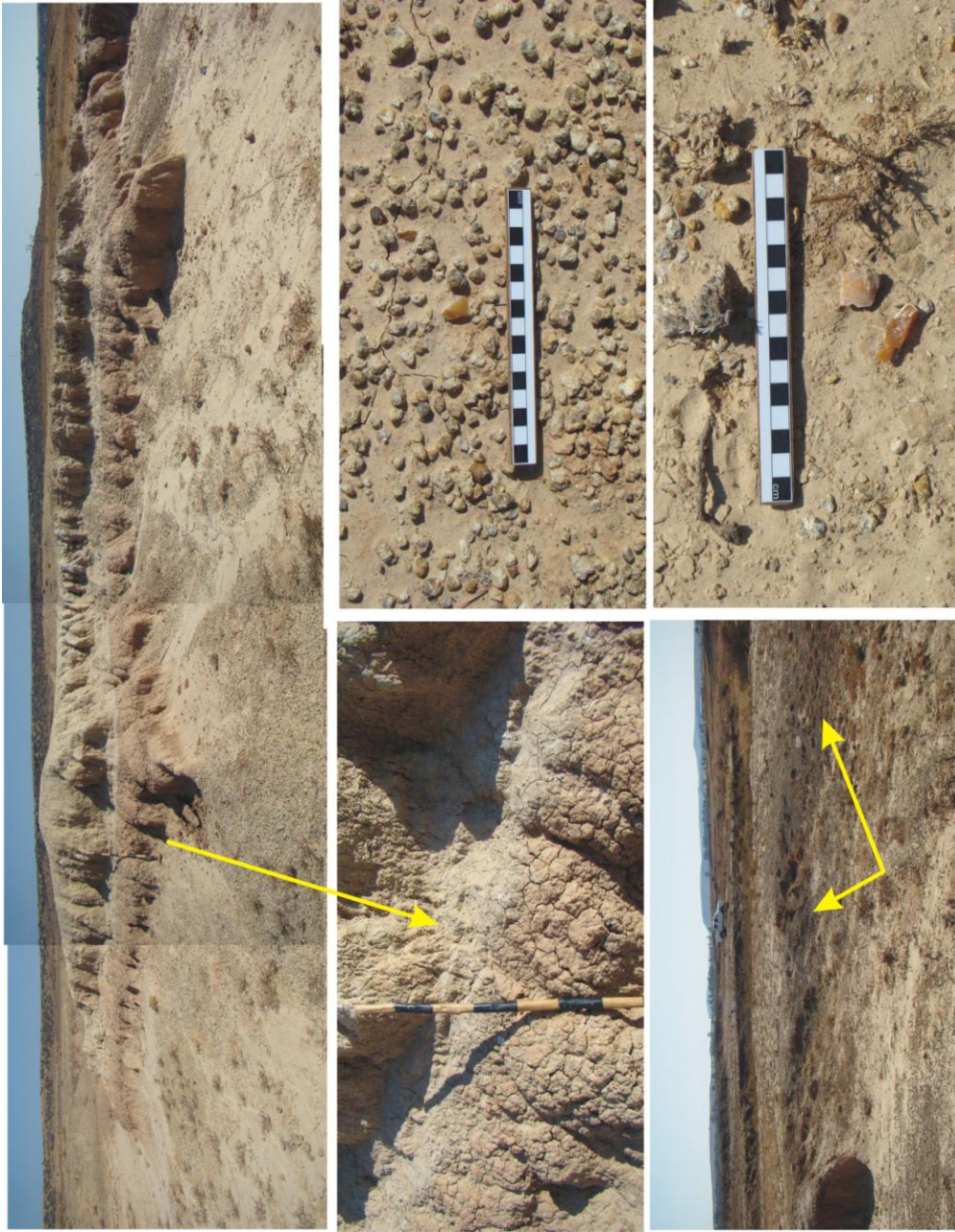


Figure 18. LSA Exposure 2 (see Table 2). A partially intact Later Stone Age site located within the alluvial overbank sediments of the Sand River and immediately outside the eastern boundary of the impact area.

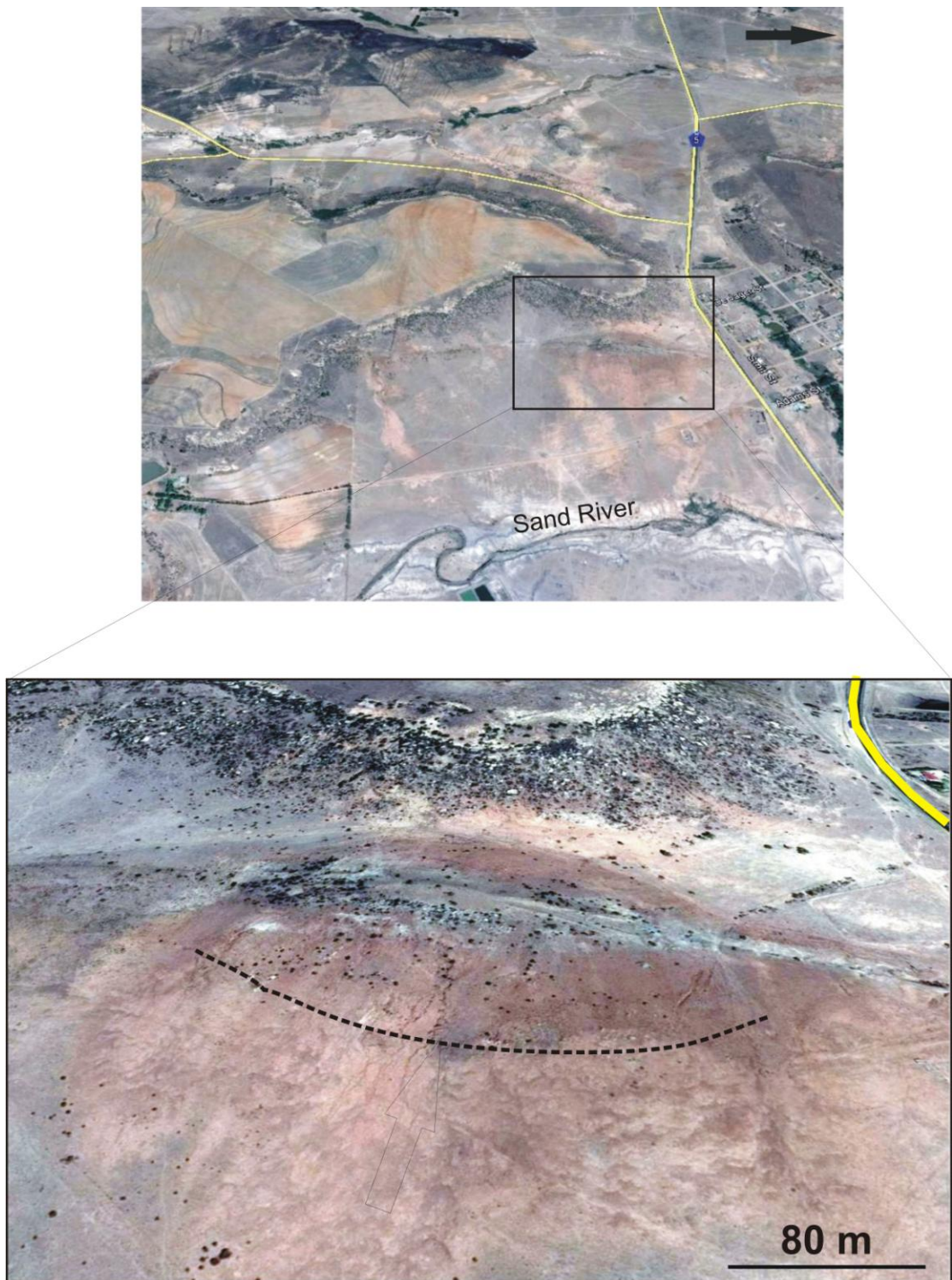


Figure 19. Aerial view of what is possibly a complex of Iron Age middens located near the northwestern corner of the study area.



Figure 20. Erosional surfaces with signs of Iron Age occupation (Area 3).

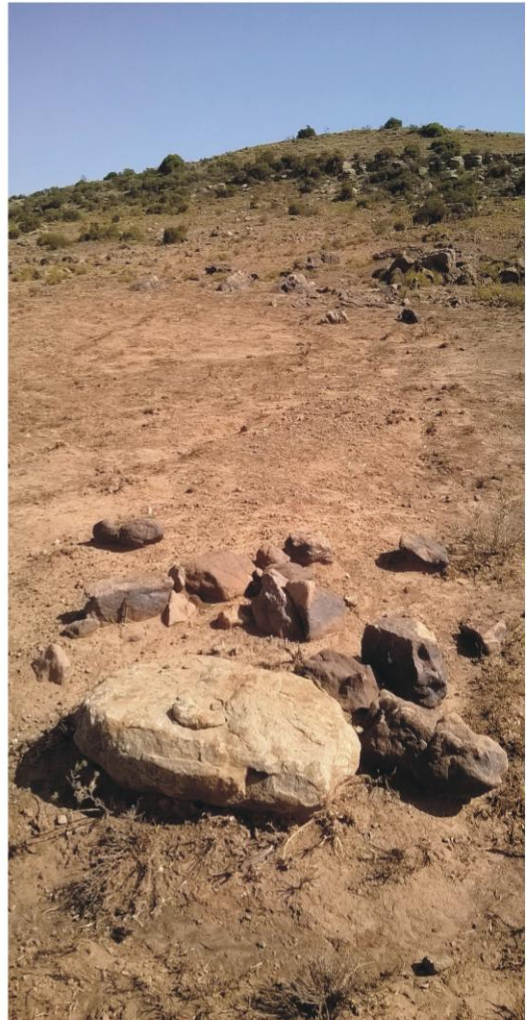


Figure 21. Pottery, stone structures and associated animal remains (Area 3).

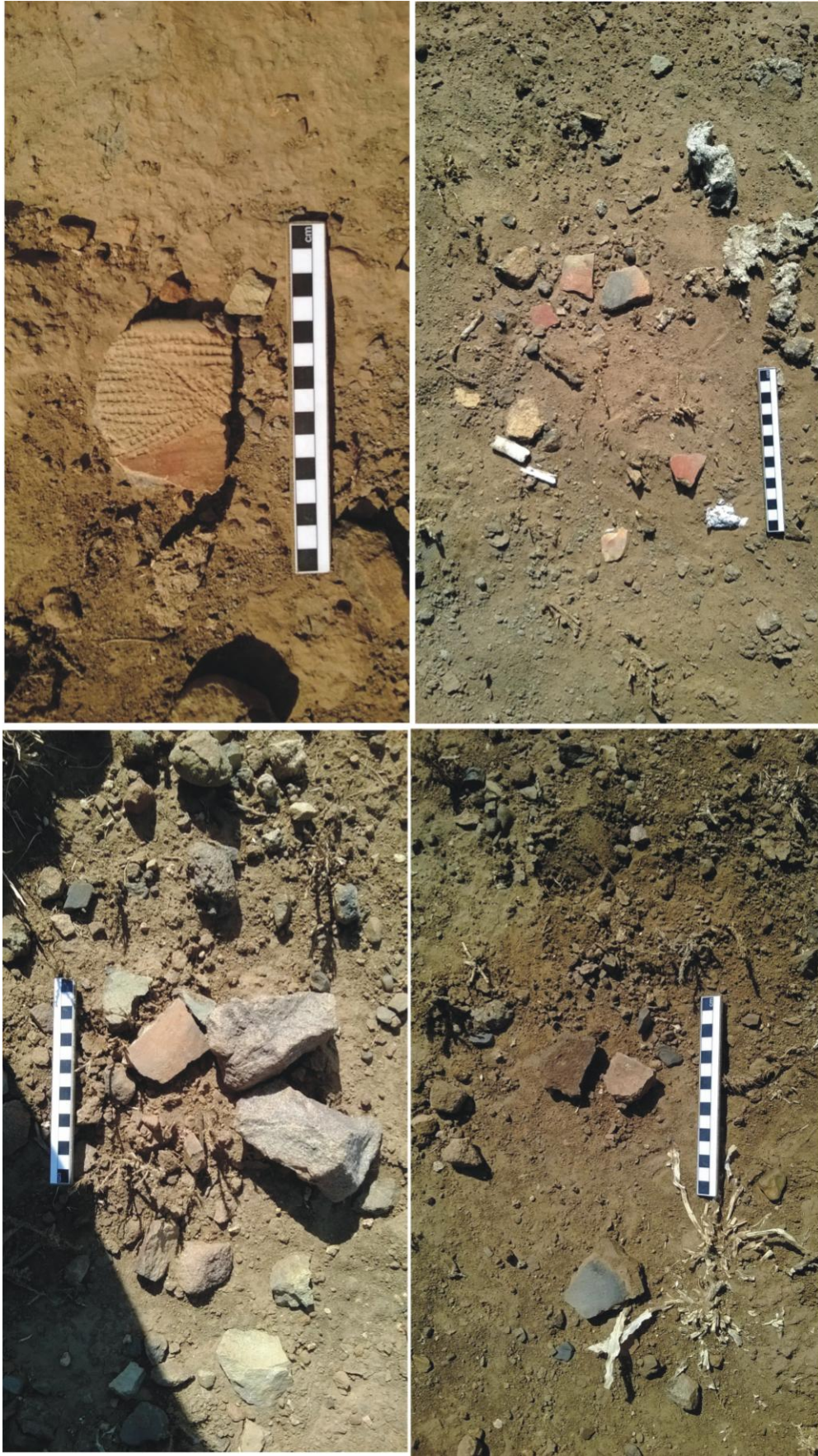


Figure 22. Localised concentrations of pottery and associated animal remains (Area 3).