

Phase 1 Archaeological & Cultural Heritage Impact Assessment –

**Koa Valley Prospecting Right Application (without Bulk Sampling),
Portions of the Farms Haramoep 53, Oonab-Noord 609, Amam 46 and Nooisabes 51,
near Springbok / Aggeneys, Namakwa District Municipality, Northern Cape**

- 19 June 2017 -

Report to:

G.P. Kriel (Environmental Impact Management Services – EIMS)

E-mail: gp@eims.co.za; Tel: 043 722 7572; Postal Address: P.O. Box 19731, Tecoma, 5214



Prepared by:

Karen van Ryneveld (ArchaeoMaps)

E-mail: karen@archaeomaps.co.za; Tel: 084 871 1064; Postal Address: Postnet Suite 239, Private Bag X3, Beacon Bay, 5205

**Koa Valley Prospecting Right Application (without Bulk Sampling),
Portions of the Farms Haramoep 53, Oonab-Noord 609, Amam 46 and Nooisabes 51,
near Springbok / Aggeneys, Namakwa District Municipality, Northern Cape**

Executive Summary

Project Description –

EIMS have been appointed as independent EAP by the project proponent, Black Mountain Mining (Pty) Ltd, to apply for EA, including a BAR and EMPr to the DMR for the proposed *Koa Valley Prospecting Right Application (without Bulk Sampling), Portions of the Farms Haramoep 53, Oonab-Noord 609, Amam 46 and Nooisabes 51, near Springbok / Aggeneys, Namakwa District Municipality, Northern Cape*. The proposed prospecting application will apply across a cumulative, approximate 65,000ha area, and including the property Farm Oonab 52. Black Mountain Mining intends to prospect for a variety of minerals including ferrous and base metals, precious metals, precious stones and nuclear fuels. Prospecting is proposed through a phased approach, including a desktop study, geological field mapping, semi-regional geophysical ground based survey and invasive activities, including assaying and drilling. For purposes of archaeological and cultural heritage compliance, as per the requirements of the NHRA 1999, development is based on thirty-four (34) drill positions, situated on the Farms Haramoep 53, Oonab-Noord 609, Amam 46 and Nooisabes 51. No drilling is proposed on Farm Oonab 52.

The Phase 1 Archaeological & Cultural Heritage Impact Assessment –

Project Name & Locality: Koa Valley Prospecting Right Application (without Bulk Sampling), Portions of the Farms Haramoep 53, Oonab-Noord 609, Amam 46 and Nooisabes 51, near Springbok / Aggeneys, Namakwa District Municipality, Northern Cape [1:50,000 Map Ref – 2918AB, 2918AD, 2918BA, 2918BB and 2918BC].

Summary of Findings: (See Page ii)

The Phase 1 AIA focussed on field assessment of the thirty-four (34) proposed drill positions. Drill positions are proposed situated on the peneplains and within the Koa Valley dune system, with both of these areas having proven to be of no to low archaeological significance. Low density MSA and LSA artefacts are present in surface gravel lenses, as has been identified at drill positions BH0221 (Site KOA-01) and BH031 (Site KOA-02) on the south-eastern peneplain of Haramoep. Similar type anthropogenic lenses have been identified elsewhere, on the peneplains of Haramoep and Nooisabes, but with these not affected by the proposed drill positions. At drill position BH0071 (Site KOA-04) low density MSA and LSA artefacts were found a workshop context, indicating that more mountainous areas may well be, from a Stone Age archaeological point of view, more significant than the peneplains. Site KOA-03 represents the Colonial Period Haramoep farmstead.

Two (2) drill positions were not accessed, including BH0111 and BH0081, due to accessibility constraints. Both drill positions are situated in the Koa Valley dune system. It is recommended that development (drilling) at the locales proceed, based on the assumption that the Koa Valley dune system is largely anthropogenically sterile, as has been identified at nine (9) drill positions proposed and assessed, situated in the dune system.

- The proposed development poses no 'fatal flaws' with reference to archaeological and cultural heritage resources.
- Consideration of a 'No-Go' option is irrelevant with reference to identified archaeological and cultural heritage resources.
- The development will have a limited negative visual impact on the cultural landscape during the construction (drilling) phase; there will be no visual impact during the operational phase.
- Proposed prospecting will not result in a negative cumulative impact on the cultural landscape, during either the construction (drilling) or operational phases.
- [A future mining application, resulting from the prospecting application, may have a more direct impact on archaeological resources as well as a visual and cumulative impact on the cultural landscape].
- [In the event of any incidental archaeological and cultural heritage resources, as defined and protected by the NHRA 1999, being identified during the course of development, and not reported on in this report, the process described in '10) Heritage Management Plan' should be followed.]

Recommendations –

With reference to archaeological and cultural heritage compliance, as per the requirements of the NHRA 1999, it is recommended that the proposed *Koa Valley Prospecting Right Application (without Bulk Sampling), Portions of the Farms Haramoep 53, Oonab-Noord 609, Amam 46 and Nooisabes 51, near Springbok / Aggeneys, Namakwa District Municipality, Northern Cape*, proceed as applied for, provided the developer comply with the listed heritage recommendations (See Page ii).

The SAHRA-APM Unit HIA Comment will state legal requirements for development to proceed, or reasons why, from a heritage perspective, development may not be further considered.

Heritage Compliance Summary – Koa Valley Prospecting Right Application (without Bulk Sampling), Portions of the Farms Haramoep 53, Oonab-Noord 609, Amam 46 and Nooisabes 51, near Springbok / Aggeneys, Namakwa District Municipality, Northern Cape				
Drill Location	Site Number	Site Description	Co-ordinates	Recommendations
Haramoep 53				
BH0221	Site KOA-01	MSA & LSA lithic scatter	S29.12480°; E18.73461°	N/A (Lithic scatter archaeologically insignificant)
BH0231	-	-	S29.12154°; E18.73901°	N/A
BH031	Site KOA-02	MSA & LSA lithic scatter	S29.11841°; E18.73877°	N/A (Lithic scatter archaeologically insignificant)
BH032	-	-	S29.11834°; E18.73432°	N/A
-	Site KOA-03	Colonial Period farmstead	S29.10819°; E18.73847°	Formal heritage conservation measures in place
BH037	-	-	S29.08819°; E18.69961°	N/A
BH0251	-	-	S29.09008°; E18.69597°	N/A
BH035	-	-	S29.08795°; E18.69088°	N/A
BH036	-	-	S29.08812°; E18.68613°	N/A
BH0201	-	-	S29.10016°; E18.63323°	N/A
BH038	-	-	S29.09565°; E18.63349°	N/A
BH0191	-	-	S29.10076°; E18.62511°	N/A
BH0211	-	-	S29.10531°; E18.62675°	N/A
BH034	-	-	S29.11733°; E18.66927°	N/A
BH0241	-	-	S29.12167°; E18.67151°	N/A
BH033	-	-	S29.12501°; E18.67171°	N/A
Oonab-Noord 609				
BH0161	-	-	S29.14523°; E18.51078°	N/A
[Oonab 52 – No drilling]				
N/A	N/A	N/A	N/A	N/A
Amam 46				
BH0151	-	-	S29.14541°; E18.43177°	N/A
BH0181	-	-	S29.14411°; E18.42902°	N/A
BH0171	-	-	S29.14760°; E18.40838°	N/A
BH0141	-	-	S29.15541°; E18.40501°	N/A
BH0131	-	-	S29.15845°; E18.40228°	N/A
BH0121	-	-	S29.16164°; E18.39675°	N/A
Nooisabes 51				
BH0111	-	-	S29.18516°; E18.37902°	Site not assessed – Recommended that development proceed
BH0081	-	-	S29.19210°; E18.36837°	Site not assessed – Recommended that development proceed
BH039	-	-	S29.19651°; E18.39073°	N/A
BH0091	-	-	S29.19867°; E18.39330°	N/A
BH0061	-	-	S29.21853°; E18.37181°	N/A
BH0051	-	-	S29.22112°; E18.36583°	N/A
BH0041	-	-	S29.21996°; E18.36093°	N/A
BH0031	-	-	S29.22201°; E18.36096°	N/A
BH0021	-	-	S29.22100°; E18.35507°	N/A
BH0011	-	-	S29.22130°; E18.35010°	N/A
BH0101	-	-	S29.22585°; E18.34233°	N/A
BH0071	Site KOA-04	MSA & LSA workshop lithic scatter	S29.23079°; E18.35581°	*Drilling impact on identified lithic scatter
*Drilling impact on identified lithic scatter recommended without the developer having to comply with additional heritage compliance requirements				

CONTENTS

1 – Declaration of Interest	1
2 – Summary of Specialist Expertise	2
3 – Introduction	3
4 – Scope of Work and Terms of Reference	6
5 – Legislative and Policy Framework	7
5.1) Archaeological & Cultural Heritage Legislative Compliance	7
5.2) Methodology and Standard Practice Compliance	7
6 – Receiving Environment	9
6.1) Pre-Feasibility Study	9
6.1.1) SAHRA Provincial Heritage Site Database – Northern Cape	9
6.1.2) The SAHRA 2009 MPD & SAHRIS	10
6.1.3) Archaeological and Cultural Heritage Background Description	11
6.2) Field Assessment	15
6.2.1) Haramoep 53	15
6.2.1.1) Drill Position BH0221 / Site KOA-01 – MSA and LSA Lithic Scatter – S29.12480°; E18.73461°	16
6.2.1.2) Drill Position BH0231 – S29.12154°; E18.73901°	16
6.2.1.3) Drill Position BH031 / Site KOA-02 – MSA and LSA Lithic Scatter – S29.11841°; E18.73877°	16
6.2.1.4) Drill Position BH0232 – S29.11834°; E18.73432°	17
6.2.1.5) Site KOA-03 – Colonial Period Farmstead – S29.10819°; E18.73847°	17
6.2.1.6) Drill Position BH037 – S29.08819°; E18.69961°	17
6.2.1.7) Drill Position BH0251 – S29.09008°; E18.69597°	17
6.2.1.8) Drill Position BH035 – S29.08795°; E18.69088°	17
6.2.1.9) Drill Position BH036 – S29.08812°; E18.68613°	17
6.2.1.10) Drill Position BH0201 – S29.10016°; E18.63323°	17
6.2.1.11) Drill Position BH038 – S29.09565°; E18.63349°	18
6.2.1.12) Drill Position BH0191 – S29.10076°; E18.62511°	18
6.2.1.13) Drill Position BH0211 – S29.10531°; E18.62675°	18
6.2.1.14) Drill Position BH034 – S29.11733°; E18.66927°	18
6.2.1.15) Drill Position BH0241 – S29.12167°; E18.67151°	18
6.2.1.16) Drill Position BH033 – S29.12501°; E18.67171°	18
6.2.2) Oonab-Noord 609	18
6.2.2.1) Drill Position BH0161 – S29.14523°; E18.51078°	18
6.2.3) Amam 46	19
6.2.3.1) Drill Position BH0151 – S29.14541°; E18.43177°	19
6.2.3.2) Drill Position BH0181 – S29.14411°; E18.42902°	19
6.2.3.3) Drill Position BH0171 – S29.14760°; E18.40838°	19
6.2.3.4) Drill Position BH0141 – S29.15541°; E18.40501°	19
6.2.3.5) Drill Position BH0131 – S29.15845°; E18.40228°	19
6.2.3.6) Drill Position BH0121 – S29.16164°; E18.39675°	19
6.2.4) Nooisabes 51	19
6.2.4.1) Drill Position BH0111 – S29.18516°; E18.37902°	20
6.2.4.2) Drill Position BH0081 – S29.19210°; E18.36837°	20
6.2.4.3) Drill Position BH039 – S29.19651°; E18.39073°	20
6.2.4.4) Drill Position BH0091 – S29.19867°; E18.39330°	20
6.2.4.5) Drill Position BH0061 – S29.21853°; E18.37181°	20
6.2.4.6) Drill Position BH0051 – S29.22112°; E18.36583°	20
6.2.4.7) Drill Position BH0041 – S29.21996°; E18.36093°	21
6.2.4.8) Drill Position BH0031 – S29.22201°; E18.36096°	21
6.2.4.9) Drill Position BH0021 – S29.22100°; E18.35507°	21
6.2.4.10) Drill Position BH0011 – S29.22130°; E18.35010°	21
6.2.4.11) Drill Position BH0101 – S29.22585°; E18.34233°	21
6.2.4.12) Drill Position BH0071 / Site KOA-04 – MSA and LSA Workshop Lithic Scatter – S29.23079°; E18.35581°	21
7 – Consideration of Related / Significant Aspect Management Plans in the Area	31
8 – Spatial Sensitivity Mapping	32
9 – Environmental Impact Rating	38

10 – Heritage Management Plan	39
11 – Conclusion	41
12 – Assumptions, Uncertainties and Gaps in Knowledge	43
13 – References	44

Appendix A:

Schematic Outline of the Pre-colonial and Colonial Periods in South Arica

Appendix B:

Acronyms & Abbreviations

List of Figures

Figure 1: Early SD diagram of the registration of Farm Haramoep 53, 1894 (CSG Record number: 456 / 1894)	14
Figure 2: Subdivision of the Farm Oonab-Noord 609 from Oonab 52, 1960, originally registered as the Farm Oonab in 1894 (CSG Record number: 447 / 1894)	14
Figure 3: Early SD diagram of the registration of Farm Amam 46, 1894 (CSG Record number: 443 / 1894)	15

List of Maps

Map 1: General locality of the Koa Valley, near Springbok / Aggeneys, Northern Cape (Base Map – Mapstudio 2008)	3
Map 2: Sketch plan for the proposed Koa Valley Prospecting Application, near Springbok / Aggeneys, Northern Cape (EIMS 2017)	4
Map 3: Koa Valley Prospecting Application, near Springbok / Aggeneys, Namakwa District Municipality, Northern Cape [1:50,000 Map Ref – 2918AB, 2918AD, 2918BA, 2918BB and 2918BC]	5
Map 4: Spatial distribution of geo-referenced PHSs in the SAHRA – Northern Cape database in relation to the Koa Valley prospecting right application (https://en.wikipedia.org/wiki/List_of_heritage_sites_in_Northern_Cape)	9
Map 5: The Koa Valley prospecting application area, indicating the localities of the 34 proposed drill positions (courtesy Alan Johnson, Black Mountain Mining)	32
Map 6: Koa Valley drill positions on Haramoep 53 and indicating the localities of the BH0221 / KOA-01071 and BH031 / KOA-02 Stone Age lithic scatters and the Site KOA-03 Colonial Period farmstead	34
Map 7: Koa Valley drill position on Oonab-Noord 609 (no heritage resources were identified on Oonab-Noord)	35
Map 8: Koa Valley drill positions on Amam 46 (no heritage resources were identified on Amam)	36
Map 9: Koa Valley drill positions on Nooisabes 51 and indicating the locality of the BH0071 / KOA-04 Stone Age lithic scatter	37

List of Plates

Plate 1: General view of BH0221 / KOA-01	22
Plate 2: Lithic artefacts from Site KOA-01	22
Plate 3: General view of BH0231	22
Plate 4: General view of BH031 / KOA-02	22
Plate 5: Lithic artefacts from Site KOA-02	23
Plate 6: General view of BH032	23
Plate 7: The Site KOA-03 farmstead	23
Plate 8: General view of BH037	23
Plate 9: General view of BH0251	24
Plate 10: General view of BH035	24
Plate 11: General view of BH036	24
Plate 12: General view of BH0201	24
Plate 13: General view of BH038	25
Plate 14: General view of BH0191	25
Plate 15: General view of BH0211	25
Plate 16: General view of BH034	25
Plate 17: General view of BH0241	26
Plate 18: General view of BH033	26
Plate 19: General view of BH0161	26
Plate 20: General view of BH0151	26
Plate 21: General view of BH0181	27
Plate 22: General view of BH0171	27
Plate 23: General view of BH0141	27
Plate 24: General view of BH0031	27
Plate 25: General view of BH0021	28
Plate 26: General view of BH039	28
Plate 27: General view of BH0091	28
Plate 28: General view of BH0061	28
Plate 29: General view of BH0051	29
Plate 30: General view of BH0041	29
Plate 31: General view of BH0031	29
Plate 32: General view of BH0021	29
Plate 33: General view of BH0011	30
Plate 34: General view of BH0101	30
Plate 35: General view of BH0071	30
Plate 36: Lithic artefacts from BH0071	30
Plate 37: General view of the Koa Valley dune system, Haramoep 53	33
Plate 38: General view of the Amamkop inselbergs, Amam 46	33
Plate 39: View of the Hutton sand peneplain with the Klein Nooisabes mountains in the background, Nooisabes 51	33

List of Tables

Table 1: Extract from the NHRA 1999, Section 38	7
Table 2: SAHRA archaeological and cultural heritage site significance assessment ratings and associated mitigation recommendations	8
Table 3: Archaeological and basic cultural heritage probability assessment	9
Table 4: Environmental Impact Assessment rating for Sites KOA-01, KOA-02 and KOA-04	38
Table 5: Environmental Impact Assessment rating for Site KOA-03	38
Table 6: Heritage compliance summary	42

1 – Declaration of Interest

I, Karen van Ryneveld (Company – ArchaeoMaps; Qualification – MSc Archaeology), declare that:

- I act as independent specialist in this application;
- I do not have any financial or personal interest in the application, its' proponent or subsidiaries, aside from fair remuneration for specialist services rendered;
- I am suitably qualified, accredited and experienced to act as independent specialist in this application;
- That work conducted have been done in an objective manner – and that any circumstances that may have compromised objectivity have been reported on transparently;
- That all material information collected for purposes of this application, that may reasonably influence the decision of the competent authority, are transparently disclosed in the report; and
- That work conducted have been done in accordance with relevant heritage legislation, regulations and policy guidelines.



Signature –

- 19 June 2017 -

2 – Summary of Specialist Expertise

Name:	Karen van Ryneveld
Contact Details:	1) Mobile – 084 871 1064 2) E-mail – karen@archaeomaps.co.za 3) Website – www.archaeomaps.co.za 4) Postal address – Postnet Suite 239, Private Bag X3, Beacon Bay, 5205
Company:	ArchaeoMaps cc
Occupation:	Archaeologist
Qualification:	MSc Archaeology (WITS University – 2003)
Accreditation:	1) Association of Southern African Professional Archaeologists (ASAPA) accredited Cultural Resources Management CRM practitioner [member nr – 163] <ul style="list-style-type: none"> o 2010 – ASAPA CRM Section: Principle Investigator – Stone Age o 2005 – ASAPA CRM Section: Field Director – Iron Age & Colonial Period 2) SAHRA, AMAFA, EC PHRA and HWC listed ASAPA accredited CRM archaeologist

Tertiary Education

2015 – Present	University of Fort Hare (UFH), East London (MPhil Environmental Studies)
2010	University of South Africa (UNISA), Pretoria (Project Management 501)
2006 – 2007	Nelson Mandela Metropolitan University (NMMU), Port Elizabeth (Undergraduate Certificate in Geographical Information Systems – GIS)
2001 – 2003	University of the Witwatersrand (WITS), Johannesburg (MSc Archaeology)
1999 – 2000	University of Pretoria (UP), Pretoria (BA Hons. Archaeology)
1991 – 1993	University of Pretoria (UP), Pretoria (BA Archaeology & History of Art)

Employment – Professional Archaeology

2007/04 – Present	ArchaeoMaps [Self-employed] (Archaeologist – CRM)
2006/06 – 2007/03	National Museum, Bloemfontein (Archaeologist – CRM, Dept. of Archaeology)
2005/04 – 2006/05	McGregor Museum, Kimberley (Archaeologist – CRM / Research, Dept. of Archaeology)
2004/04 – 2005/01	Amafa aKwaZulu-Natali (HoD: Archaeology, Palaeontology & Meteorites Unit – APM Unit)
2002/09 – 2004/03	McGregor Museum, Kimberley (Archaeologist – CRM / Research, Dept. of Archaeology)

Employment – Freelance: Ground Penetrating Radar

2015/10 – Present	Terra Scan assistant (BCM area, EC) – GPR & underground utilities focussing on petrol retail (oil & gas) industry
-------------------	---

Archaeology – Summary

Karen has been involved in CRM archaeology since 2003 and has been the author (including selected co-authored reports) of approximately 500 Phase 1 AIA studies. Phase 1 AIA work is centred in South Africa, focussing on the Northern and Eastern Cape provinces and the Free State. She has also conducted Phase 1 work in Botswana (2006 / 2007). In 2007 she started ArchaeoMaps, an independent archaeological and heritage consultancy. In 2010 she was awarded ASAPA CRM Principle Investigator (PI) status based on large scale Phase 2 Stone Age mitigation work (De Beers Consolidated Mines – Rooipoort, Northern Cape, 2008 / 2009) and has also been involved in a number of other Phase 2 projects including Stone Age, Shell Middens, Grave / Cemetery projects and Iron Age sites.

In addition to CRM archaeology she has been involved in research, including the international collaborations at Maloney's Kloof and Grootkloof, Ghaap Plateau, Northern Cape (2005 / 2006). Archaeological compliance experience includes her position as Head of the Archaeology, palaeontology and Meteorites (APM) Unit at AMAFA aKwaZulu-Natali (2004).

Company Profile

Company Name	: ArchaeoMaps cc
Registration Number	: 2005/180719/23
VAT Number	: Not VAT Registered
Accountant	: AZIMA Financial Services
Members / Shareholders	: Karen van Ryneveld (100%)
BBBEE Status	: Exempted Micro Enterprise (EME)

Environmental Impact Management Services (EIMS) have been appointed as independent Environmental Assessment Practitioner (EAP) by the project proponent, Black Mountain Mining (Pty) Ltd, to apply for Environmental Authorization (EA), including a Basic Assessment Report (BAR) and Environmental Management Plan (EMPr) to the Department of Mineral Resources (DMR) for the proposed *Koa Valley Prospecting Right Application (without Bulk Sampling), Portions of the Farms Haramoep 53, Oonab-Noord 609, Amam 46 and Nooisabes 51, near Springbok / Aggeneys, Namakwa District Municipality, Northern Cape* [1:50,000 Map Ref – 2918AB, 2918AD, 2918BA, 2918BB and 2918BC].

The proposed prospecting application will apply across a cumulative, approximate 65,000ha area, and including the property Farm Oonab 52. Black Mountain Mining intends to prospect for a variety of minerals including ferrous and base metals (copper, iron, lead, zinc, manganese, nickel and molybdenum), precious metals (gold and silver), precious stones (diamonds) and nuclear fuels (uranium). Prospecting is proposed through a phased approach, including a desktop study, geological field mapping, semi-regional geophysical ground based survey and invasive activities, including assaying and drilling (EIMS 2017). For purposes of archaeological and cultural heritage compliance, as per the requirements of the National Heritage Resources Act, No 25 of 1999 (NHRA 1999), development is based on thirty-four (34) drill positions, situated on the Farms Haramoep 53, Oonab-Noord 609, Amam 46 and Nooisabes 51. No drilling is proposed on Farm Oonab 52.

Proposed phased prospecting is outlined as (EIMS 2017):

1. Desktop Study –

Compilation of historical exploration data and analysis of existing data to target and rank prospecting areas.

2. Geological Field Mapping –

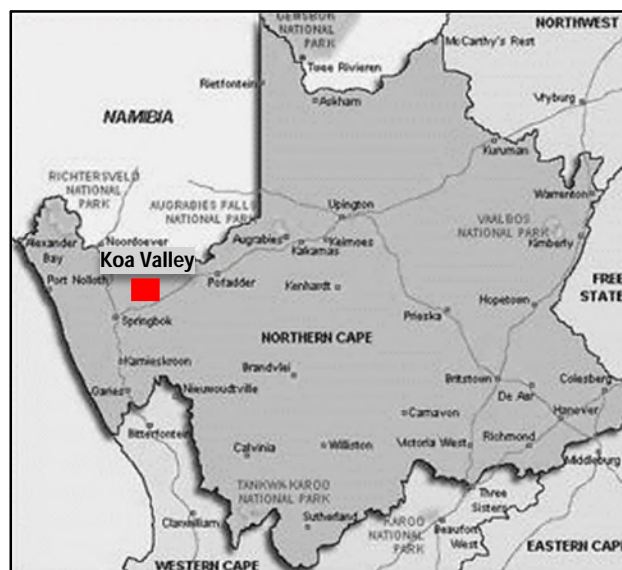
Field mapping (including soil and litho-sampling) will focus on potential prospecting areas to define the structure and geology for employment of geophysical exploration techniques and interpretation.

3. Semi-Regional Geophysical Ground Based Survey –

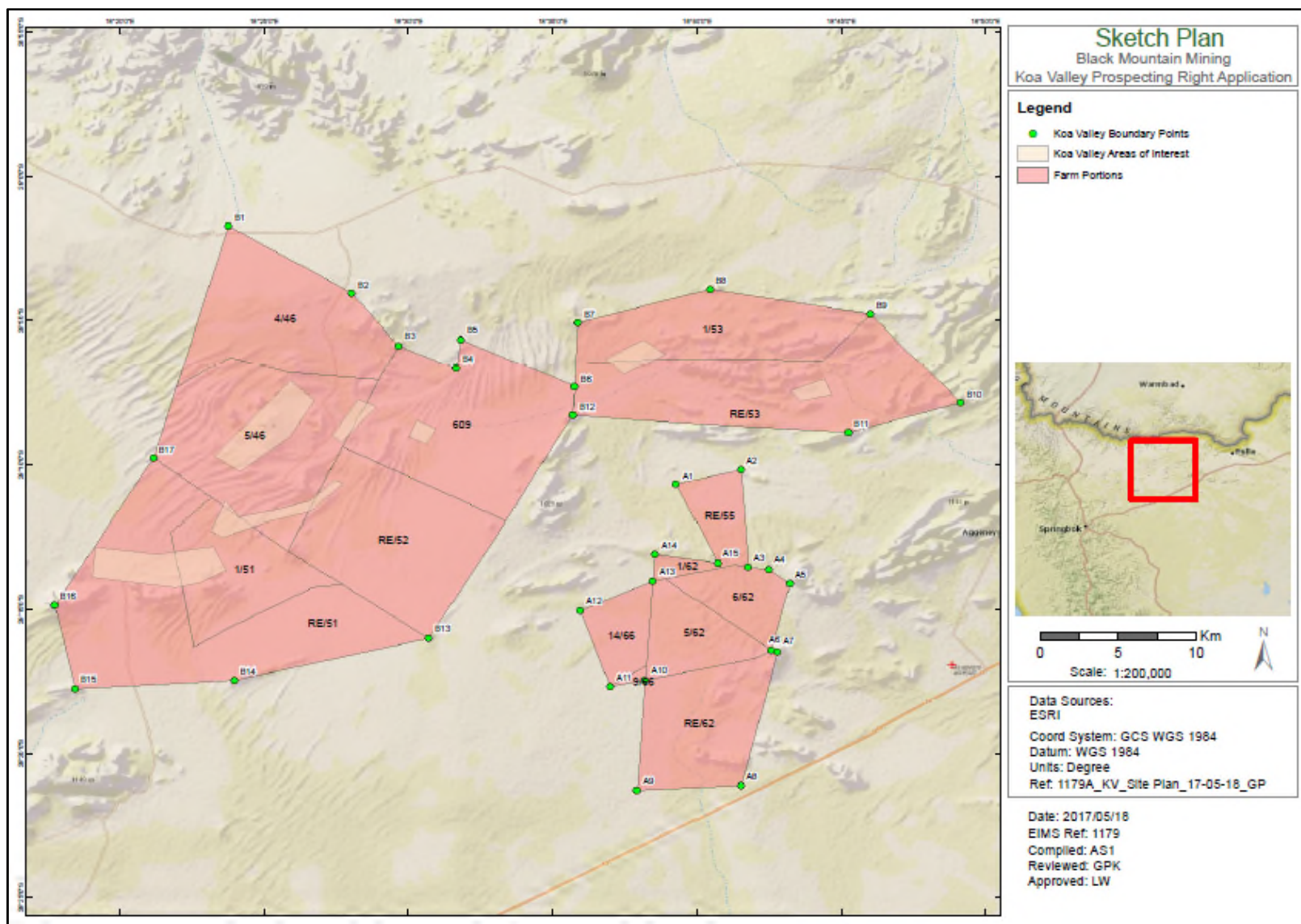
Ground based geophysical exploration will primarily be based on time-domain electromagnetics (TDEM). Existing airborne electromagnetics (EM) and aeromagnetic coverage will guide ground based geophysical exploration. Additional techniques such as controlled source audio magnetotellurics (CSAMT) and direct current resistivity / induced polarization might be employed.

4. Invasive Activities –

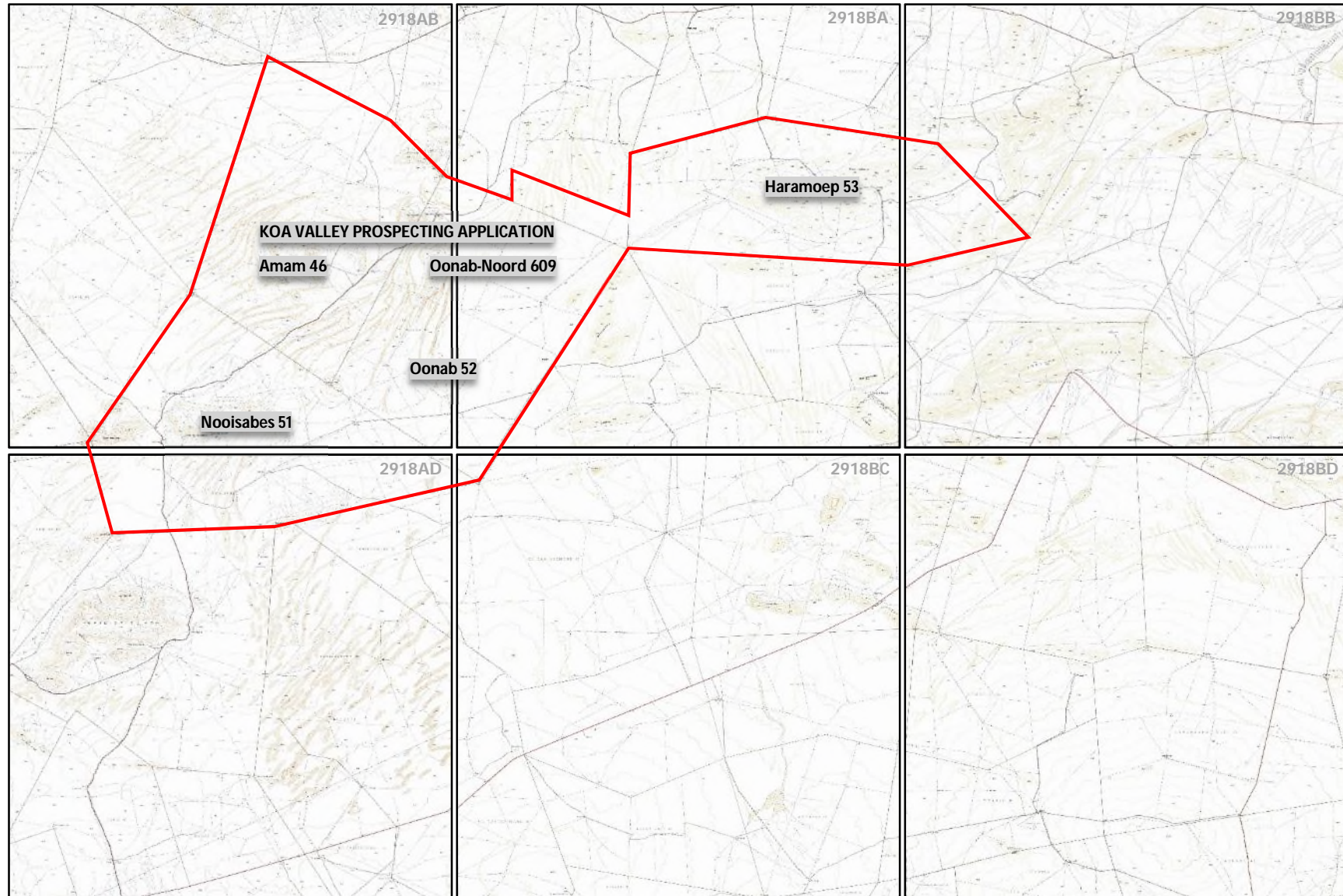
Geological field mapping and geophysical survey results are used to determine drilling locations. Thirty-four (34) drill locations have been identified. Vertical (down the hole) geophysical surveys will be done upon completion of exploratory boreholes. Assaying (rock chip / soil samples) and borehole cored samples will be send for laboratory metallurgical testing.



Map 1: General locality of the Koa Valley, near Springbok / Aggeneys, Northern Cape (Base Map – Mapstudio 2008)



Map 2: Sketch plan for the proposed Koa Valley Prospecting Application, near Springbok / Aggeney, Northern Cape (EIMS 2017)



Map 3: Koa Valley Prospecting Application, near Springbok / Aggeneys, Namakwa District Municipality, Northern Cape [1:50,000 Map Ref – 2918AB, 2918AD, 2918BA, 2918BB and 2918BC]

4 – Scope of Work and Terms of Reference

ArchaeoMaps have been appointed by EIMS to compile the Phase 1 Archaeological & Cultural Heritage Impact Assessment (AIA) for the proposed *Koa Valley Prospecting Right Application (without Bulk Sampling), Portions of the Farms Haramoep 53, Oonab-Noord 609, Amam 46 and Nooisabes 51, near Springbok / Aggeneys, Namakwa District Municipality, Northern Cape*. The Phase 1 AIA comprises a specialist component to the application's Heritage Impact Assessment (HIA), and with findings and recommendations thereof to be included in the BAR and EMPr. The Scope of Work (SoW) for the Phase 1 AIA is two-fold in nature, including:

- To undertake an archaeological assessment of the study site (drill positions) in order to document heritage sites and develop a heritage sensitivity map of the proposed prospecting right application area; and
- To develop a heritage management plan for the prospecting right application.

Specific Terms of Reference (ToR) for the Phase 1 AIA are summarized as:

- Describe the existing area to be directly affected by the proposal in terms of its archaeological and cultural heritage characteristics as formally protected by the National Heritage Resources Act, No 25 of 1999 (NHRA 1999) and the general sensitivity of these components to change;
- Describe the likely scope, scale and significance of impacts (positive and negative) on the archaeological and cultural heritage resources of the area associated with the 1) construction (drilling) and 2) operation or use phases of the proposal;
- Make recommendations on the scope of any mitigation measures that may be applied during the 1) construction (drilling) and 2) operation or use phases to reduce / avoid the significance of identified related impacts. Mitigation measures could be design recommendations as well as operational controls, monitoring programmes, Phase 2 mitigation, management procedures and the like;
- Broadly describe the implication of a 'No-Go' option;
- Broadly comment on the cumulative impact (positive or negative) on archaeological or cultural heritage resources associated with the 1) construction (drilling) and 2) operation or use phases of the proposal; and
- Confirm if there are any outright 'fatal flaws' to the proposal at its current location from an archaeological and cultural heritage perspective.

5.1) Archaeological & Cultural Heritage Legislative Compliance

The Phase 1 AIA for the proposed *Koa Valley Prospecting Right Application (without Bulk Sampling), Portions of the Farms Haramoep 53, Oonab-Noord 609, Amam 46 and Nooisabes 51, near Springbok / Aggeneys, Namakwa District Municipality, Northern Cape*, was requested to meet the South African Heritage Resources Agency's (SAHRA) requirements with reference to archaeological and basic cultural heritage resources in terms of the National Heritage Resources Act, No 25 of 1999 (NHRA 1999), with specific reference to Section 38(1)(e). This report is submitted in (partial) fulfilment of the NHRA 1999, Section 38(3) requirements, for purposes of a NHRA 1999, Section 38(4) / Section 38(8) Heritage Impact Assessment (HIA) Comment by SAHRA.

NHRA 1999, 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 300m in length;
b)	The construction of a bridge or similar structure exceeding 50m in length;
c)	Any development or other activity which will change the character of a site –
	i. Exceeding 5,000m ² 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 10,000m ² in extent;
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.

Table 1: Extract from the NHRA 1999, Section 38

The Phase 1 AIA aimed to locate, identify and assess the significance of archaeological and cultural heritage resources, inclusive of archaeological deposits / sites (Stone Age, Iron Age and Colonial Period), rock art and shipwreck sites, built structures older than 60 years, sites of military history older than 75 years, certain categories of burial grounds and graves, graves of victims of conflict, basic living heritage and cultural landscapes and viewsapes as defined and protected by the NHRA 1999, Section 2, 34, 35 and 36, that may be affected by the development.

This report comprises a Phase 1 AIA, including a basic pre-feasibility study and field assessment only. The report was prepared in accordance with the 'Minimum Standards' specifications for Phase 1 AIA reports, as stipulated by SAHRA (2007).

Additional relevant legislation pertaining to the Phase 1 AIA is listed as:

- National Environmental Management Act, No 107 of 1998 (NEMA 1998) and associated Regulations (2014); and
- Mineral and Petroleum Resources Development Act, No 28 of 2002 (MPRDA 2002).

5.2) Methodology and Standard Practice Compliance

The Phase 1 AIA includes a basic pre-feasibility study and field assessment:

- The pre-feasibility assessment is based on the Appendix A schematic outline of South Africa's Pre-colonial and Colonial past, associated with introductory archaeological as well as general and scientific literature available and relevant to the study site. Databases consulted include the SAHRA 2009 Mapping Project Database (MPD), the South African Heritage Resources Information System (SAHRIS) and SAHRA database(s) on declared Provincial Heritage Sites (PHS) pertaining to the study site. The study excludes consultation of museum and university databases.

- The field assessment was done over a 3 day period (2017-06-09 to 2017-06-11) with fieldwork conducted by the author. The assessment was done by vehicle and foot and limited to a Phase 1 surface survey. GPS co-ordinates were taken with Garmin Montana 650 (Datum: WGS84) Photographic documentation was done with a Canon EOS 1300D camera. A combination of Garmap (Base Camp) and Google Earth software was used in the display of spatial information.

The Phase 1 AIA was done according to the system and 'Minimum Standards' prescribed for the 3-tiered Phase 1-3 HIA process (SAHRA 2007):

- Phase 1 HIA – A Phase 1 HIA is compulsory for development types as stipulated in the NHRA 1999, Section 38(1) and Section 38(8), including any other development type or study site as required by the South African Heritage Resources Agency (SAHRA) or relevant Provincial Heritage Resources Authority (PHRA). A Phase 1 HIA comprises at minimum of an archaeological (AIA) and palaeontological (PIA) study, but aims to address all heritage types protected by the NHRA 1999 and to alert developers to additional heritage specialist study requirements, if and where relevant to a development. Phase 1 HIA studies focusses on pre-feasibility and desktop studies, routinely coined with field assessments in order to locate, describe and assign heritage site significance ratings to identified resources that may be impacted by development. The aim of a Phase 1 AIA is to make site specific and general development recommendations regarding identified heritage resources for development planning and implementation purposes and may include recommendations for conservation, heritage site declaration, monitoring, Phase 2 mitigation (excavation), or destruction.
- Phase 2 HIA – Phase 2 HIAs are as a norm required where heritage resources of such significance have been identified during the Phase 1 HIA that mitigation (excavation) thereof is necessary for development purposes. Aside from large scale Phase 2 mitigation (routinely to precede development impact), lower keyed Phase 2 requirements may well include sampling, testing and monitoring during the construction or implementation phase of a development. Phase 2 HIA work is as a norm done under a compulsory heritage permit.
- Phase 3 HIA – As an extension to Phase 2 HIA work or cases where recommendations for heritage declaration formed part of a development's heritage compliance requirements, heritage resources of such scientific or heritage tourism significance, that their long-term conservation and continued research would be necessary within a development framework is proposed as a Phase 3 HIA.

Archaeological and cultural heritage site significance assessment and associated mitigation recommendations are done according to the combined NHRA 1999, Section 7(1) and SAHRA (2007) system.

SAHRA Archaeological & Cultural Heritage Site Significance System			
Site Significance	Field Rating	Grade	Recommended Mitigation
High Significance	National Significance	Grade I	Heritage site conservation / Heritage site development
High Significance	Provincial Significance	Grade II	Heritage site conservation / Heritage site development
High Significance	Local Significance	Grade III-A	Heritage site conservation or extensive mitigation prior to development / destruction
High Significance	Local Significance	Grade III-B	Heritage site conservation or extensive mitigation prior to development / destruction
High / Medium Significance	Generally Protected A	Grade IV-A	Heritage site conservation or mitigation prior to development / destruction
Medium Significance	Generally Protected B	Grade IV-B	Heritage site conservation or mitigation / test excavation / systematic sampling / monitoring prior to or during development / destruction
Low Significance	Generally Protected C	Grade IV-C	On-site sampling, monitoring or no heritage mitigation required prior to or during development / destruction

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

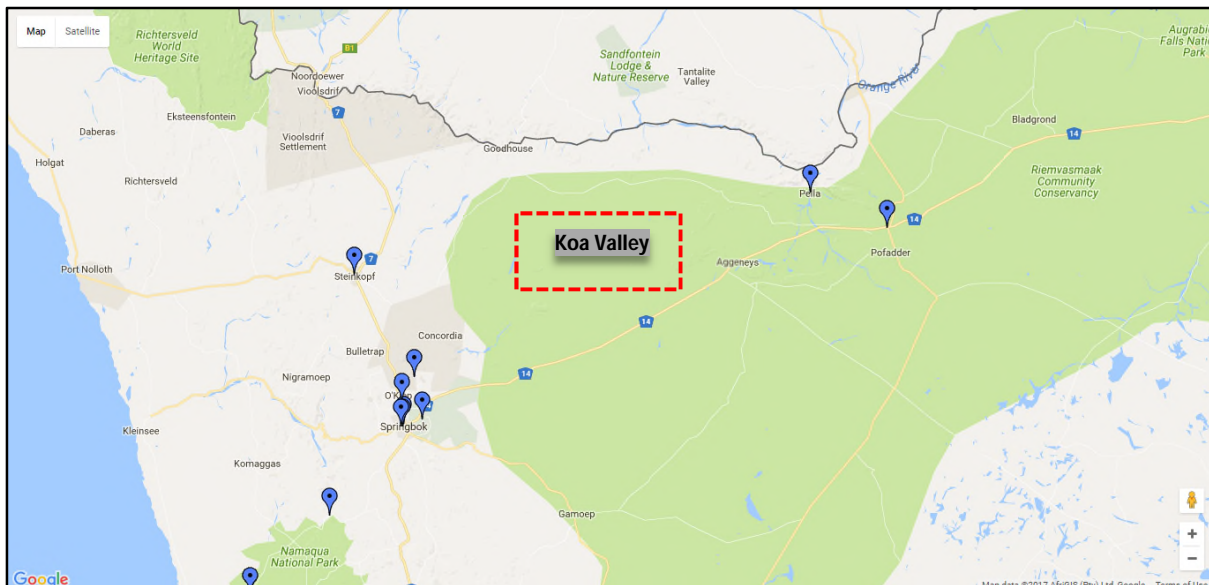
6.1) Pre-Feasibility Study

Based on the Appendix A schematic outline of the Pre-colonial and Colonial Periods in South Africa and background literature and database information, the probability of archaeological and cultural heritage resources situated on, or in proximity to the proposed *Koa Valley Prospecting Right Application (without Bulk Sampling), Portions of the Farms Haramoep 53, Oonab-Noord 609, Amam 46 and Nooisabes 51, near Springbok / Aggeneys, Namakwa District Municipality, Northern Cape*, can briefly be described as:

Archaeological and Basic Cultural Heritage Probability Assessment – Koa Valley Prospecting Right Application (without Bulk Sampling), Portions of the Farms Haramoep 53, Oonab-Noord 609, Amam 46 and Nooisabes 51, near Springbok / Aggeneys, Namakwa District Municipality, Northern Cape			
Primary Type / Period	Sub-period	Sub-period type site	Probability
EARLY HOMININ / HOMINID	-	-	None
	Graves / human remains: High scientific significance		
STONE AGE	Earlier Stone Age (ESA)		Low-Medium
	Middle Stone Age (MSA)		Medium
	Later Stone Age (LSA)		Medium
		Rock Art	None-Low
		Shel Middens	None
Graves / human remains: ESA & MSA - High scientific significance; LSA – High scientific & social significance			
IRON AGE	Early Iron Age (EIA)		None
	Middle Iron Age (MIA)		None
	Later Iron Age (LIA)		None-Low
	Graves / human remains: EIA – High scientific significance; MIA & LIA – High scientific & social significance		
COLONIAL PERIOD	Colonial Period		Low-Medium
		LSA – Colonial Period Contact	Low-Medium
		LIA – Colonial Period Contact	None
		Industrial Revolution	None-Low
		Apartheid & Struggle	Low
Graves / human remains: Medium-high scientific & high social significance			

Table 3: Archaeological and basic cultural heritage probability assessment

6.1.1) SAHRA Provincial Heritage Site Database – Northern Cape



Map 4: Spatial distribution of geo-referenced PHSs in the SAHRA – Northern Cape database in relation to the Koa Valley prospecting right application (https://en.wikipedia.org/wiki/List_of_heritage_sites_in_Northern_Cape).

No declared geo-referenced Provincial Heritage Sites (PHS) are recorded in the SAHRA – Northern Cape database (https://en.wikipedia.org/wiki/List_of_heritage_sites_in_Northern_Cape) and situated within an approximate 15km radius from the Koa Valley prospecting right application, near Springbok / Aggeneys, Namakwa District Municipality, Northern Cape, study site, with the closest recorded geo-referenced PHSs being situated in Springbok, Steinkopf, Pella and Pofadder respectively, all being in excess of 30-50km from the study site.

6.1.2) The SAHRA 2009 MPD & SAHRIS

No archaeological Cultural Resources Management (CRM) reports are recorded in the SAHRA 2009 Mapping Project Database (MPD) situated within a 15km radius from the prospecting right application on Farm Aroams 1/57. Post compilation of the SAHRA 2009 MPD a rich array of archaeological CRM reports is recorded in the general vicinity of the study site, reflecting not only an increase in development proposals in the greater area, but also a greater commitment by developers to the HIA compliance system. Archaeological CRM studies conducted, and recorded in the South African Heritage Information System (SAHRIS), with study sites situated within a 15km radius from the prospecting right application on Farm Aroams 1/57 are listed as:

- De Kock, S. 2012. (Perception Heritage Planning). *Draft Phase 1 Integrated Heritage Impact Assessment Compiled in Terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act 25 of 1999). Proposed Boesmanland Solar Farm (75MW): Portion (300ha) of the Farm Zuurwater 62/6, Namakwaland District, Northern Cape Province.* [SAHRIS CaseID 56 & 3812].
- Birkholtz, P. 2016. (PGS). *Spionkop Prospecting Right Project Located on Various Farm Portions near Aggeneys, Nama-Khoi Local Municipality, Namakwa District, Northern Cape Province. Heritage Study: Impact Assessment Report.* [SAHRIS CaseID 10390].
- Morris, D. 2010. (McGregor). *Cultural Heritage Assessment. Gamsberg – Supplementary Observations to a Previous Specialist Report on Archaeological Resources.* [SAHRIS CaseID 2215].
- Morris, D. 2011. (McGregor). *Sato Energy Holdings Zuurwater Photovoltaic Energy Generation Facility Development near Aggeneys, Northern Cape. Heritage Impact Assessment.* [SAHRIS CaseID 2283 & 3812].
- Morris, D. 2013a. (McGregor). *Archaeological and Cultural Heritage Investigation for the Environmental and Social Impact Assessment (ESIA) for the Gamsberg Zinc Mine and Associated Infrastructure in Northern Cape, South Africa.* [SAHRIS CaseID 2215].
- Morris, D. 2013b. (McGregor). *Heritage Impact Assessment for the Proposed Photovoltaic Solar Energy Facilities on the Farm Zuurwater, near Aggeneys, Northern Cape Province. (Expanded Survey).* [SAHRIS CaseID 2283].
- Morris, D. 2013c. (McGregor). *Solar PV Installation on the Property Dabenoris 44, near Aggeneys, Northern Cape: Scoping Phase Heritage Input.* [SAHRIS CaseID 3212].
- Morris, D. 2013d. (McGregor). *Heritage Impact Assessment: Proposed Aggeneys Photovoltaic Solar Energy Facility at Bloemhoek near Aggeneys, Northern Cape Province.* [SAHRIS CaseID 4759].
- Orton, J. 2015a. (ASHA). *Final Archaeological Survey for the Proposed Aggeneys Solar Energy Facility, Namakwaland Magisterial District, Northern Cape.* [SAHRIS CaseID 125].
- Orton, J. 2015b. (ASHA). *Heritage Scoping Study for Sol Invictus Solar PV Development on Ou Taaibosmond 66/5, Namakwaland Magisterial District, Northern Cape.* [SAHRIS CaseID 8762].
- Orton, J. 2016. (ASHA). *Heritage Impact Assessment for the Proposed Sol Invictus 1 PV Facility, Namakwaland Magisterial District, Northern Cape.* [SAHRIS CaseID 8762].
- Orton, J. & Webley, L. 2012. (ACO). *Heritage Impact Assessment for the Proposed Kangnas Wind and Solar Energy Facilities, Namakwa Magisterial District, Northern Cape.* [SAHRIS CaseID 136].
- Rossouw, L. (undated a). (Palaeo Field Services). *Phase 1 Heritage Impact Assessment for Proposed Prospecting Drilling on Portion 2 of Rozybosch No 41 and Remaining Extent and Portion 1 of Wortel No 42, Namakwaland District, Northern Cape Province.* [SAHRIS CaseID 7647].
- Rossouw, L. (undated b). (Paleo Field Services). *Phase 1 Heritage Impact Assessment for Proposed Prospecting Drilling in the Big Syncline Area on the Farm Aggeneys 56 Portion 01, Khai-ma Local Municipality, NC Province.* [SAHRIS CaseID 8004].
- Smith, A. B. 2012. (UCT – Department of Archaeology). *Archaeology Report. Proposed 75MW Solar Facility on Farm 62, Zuurwater, Aggeneys, Northern Cape.* [SAHRIS CaseID 3812].
- Webley, L. 2012. (ACO). *Desktop Heritage Impact Assessment: Proposed 1.5ha Extension of Gravel Mine, Portion 2 of the Farm Aroams 57, near Aggeneys, Northern Cape.* [SAHRIS CaseID 119].

- Webley, L. & Halkett, D. 2012. (ACO). *Heritage Impact Assessment: Proposed Aggeneys Photovoltaic Solar Power Plant on Portion 1 of the Farm Aroams 57, Northern Cape Province*. [SAHRIS CaseID 91, 125 & 5801].
- Webley, L. & Halkett, D. 2017a. (ACO). *Heritage Impact Assessment: Proposed Construction of the Letsoai CSP 1 Solar Facility on the Remaining Extent of the Farm Hartebeest Vlei 86, near Aggeneys, as well as Water Pipeline to the Orange River, Northern Cape*. [SAHRIS CaseID 10134].
- Webley, L. & Halkett, D. 2017b. (ACO). *Heritage Impact Assessment: Proposed Construction of the Enamandla PV 1 Solar Facility on the Remaining Extent of the Farm Hartebeest Vlei 86, near Aggeneys, Northern Cape*. [SAHRIS CaseID 10138 & 10164].
- Webley, L. & Halkett, D. 2017c. (ACO). *Heritage Impact Assessment: Proposed Construction of the Enamandla PV 2 Solar Facility on the Remaining Extent of the Farm Hartebeest Vlei 86, near Aggeneys, Northern Cape*. [SAHRIS CaseID 10139].
- Webley, L. & Halkett, D. 2017d. (ACO). *Heritage Impact Assessment: Proposed Construction of the Enamandla PV 3 Solar Facility on the Remaining Extent of the Farm Hartebeest Vlei 86, near Aggeneys, Northern Cape*. [SAHRIS CaseID 10163].
- Webley, L. & Halkett, D. 2017e. (ACO). *Heritage Impact Assessment: Proposed Construction of Letsoai and Enamandla 400kV Powerline and Substation Facilities, near Aggeneys, Northern Cape*. [SAHRIS CaseID 10180].

6.1.3) Archaeological and Cultural Heritage Background Description

Archaeological CRM reports consulted sketched a two-tiered cultural layering of the landscape, including a Stone Age and Colonial Period occupation. The extremely arid landscape, characterized by flat drainage plains, or peneplains of red Hutton sands, aeolian sands dating back to the Quaternary, are intersected by granite inselbergs protruding above the peneplains and including amongst others the Aggeneys, Black and Gamsberg Mountains. The Koa Valley itself is typified by a red Hutton sand dune system, aeolian dunes, believed to date back to Miocene times, when they formed part of a major drainage system from the interior. The current arid landscape is reasonably inferred to represent a basic Holocene landscape, with much wetter conditions having had prevailed to as late as the Plio- and Pleistocene, or during Earlier (ESA) and Middle Stone Age (MSA) times. (Beaumont *et. al.* 1995)

The ESA Acheulean is poorly represented and documented by means of mostly singular bifaces, or handaxes (Morris 2011; De Kock 2012). Morris (2010, 2011, 2013a) and Smith (2012) reported on low density lithic scatters containing ESA, MSA and Later Stone Age (LSA) typological samples, in cases found in a workshop context. Said deposits identified by Morris (2013a) on Gamsberg probably represents the most significant ESA Acheulean associated deposits as yet identified, but reported on as surface scatters only, with a totally eroded, lagged context, situated on the exposed granite substrate of Gamsberg itself. Of particular ESA significance is the identification of the Victoria West Industry, invariably referred to as ESA, a later ESA, a component of the first transitional period (between the ESA and MSA), and an early expression of a prepared core and flake technique, which came to maturation during the MSA as the *Levallois* technique, although continuous evolution of the Victoria West to the *Levallois* is yet to be proven. Morris (2013d) reported on a Victoria West Industry on the property Bloemhoek characterized by prepared cores, associated with notably long blades and a low incidence of handaxes and cleavers. The report by Morris is of particular significance with direct reference to the reported on extent of the Victoria West Industry, a technological Industry that has received markedly little attention in Stone Age research considering its prominence in lithic technological development.

The MSA is reported on widely in archaeological CRM reports, characterised by an amorphous, fairly crude typology, with quartz having been the primary raw material used, but including production on quartzite and to a lesser extend local dolerite and other raw materials. Deposits are in general described as of low archaeological significance, based on the low ratio of artefacts present at recorded findspots, but including reference to poor typology, a direct result of the primary raw material used; quartz simply not having knapping qualities suitable to prepared technological techniques. Sites identified to date are recorded mostly from the peneplains, but including a few assemblages from mountainous areas, as identified at Gamsberg, but an environmental preference for the peneplains, rather than mountainous areas seems to have prevailed during MSA times. MSA scatters or occurrences are reported on widely in archaeological CRM reports, identified mostly as singular type assemblages, in a few cases associated with ESA lithic samples, and more often in association with LSA types (De Kock 2012; Morris 2010, 2011, 2013a, 2013b, 2013d; Orton 2015a, 2015b, 2016; Orton & Webley 2012; Webley & Halkett 2012, 2017a, 2017b, 2017c, 2017d).

The LSA of the greater terrain is of intriguing heritage significance, effectively defining the 'Bushmanland' deposits. Prior to 2kya LSA hunter-gatherers (San, or Bushmen) settled primarily along the Orange River and the coastline, with extensive pre-pottery LSA assemblages, in both spatial extent and with reference to deposit depth confirming this. By 2kya LSA herder groups (Khoekhoe, Khoekhoen or Khoi) moved into South Africa, with the Great Namaqua (or Nama) occupying the greater northern Northern Cape area, but with smaller groups such as the Namnykoa recorded to have settled along the Orange River corridor and the Eniqua in the area west of Aggeneys. The influx of Khoekhoe groups into the original San area of occupation resulted in a forced displacement, with San bands seeking refuge from socio-political pressures deeper into the interior, the hinterland, the area named 'Bushmanland' during Colonial Period times. San occupation of 'Bushmanland' is thus fairly recent, dating to between 2-1kya and extending into Colonial Period times. San bands were small, directly associated with the harsh, arid environmental conditions of 'Bushmanland', an environment that at its best allowed a notably low carrying capacity, of both humans and game. Accordingly, the 'Bushmanland' LSA hunter-gatherer sites are small, low density sites, more than often characterized by simple ephemeral artefact scatters, reflecting small San bands, extremely mobile across the landscape. San bands may well have gathered in greater numbers during more favourable conditions, for example after a good rainy season, but this also being reported times when hostile Khoekhoe groups would venture into the interior. Competition between LSA herders and LSA hunter-gatherer groups mark the first archaeologically recorded displacement and marginalization of the San in the northern Northern Cape (Beaumont *et. al.* 1995).

By 1770 Colonial 'trekboers' moved into the area, initially, very similar to the San, living a transhumance existence; seasonal migration of farmers with their livestock from the hinterland to the coast were commonplace, and especially in the harsh, arid interior strife competition over natural resources prevailed, often resulting in livestock raids by San groups and farmer commandos retaliating, inevitably ensuing in a number of skirmishes. Early travelogues by Thomson (1827) and Dunn (1931), who visited 'Bushmanland' in 1824 and 1827 respectively provide interesting vestiges of the early Colonial Period / indigenous social geography. As early as 1863 Anthing reported on conflict between the 'trekboers' and the San, locally known as 'Obseses', in the Gamsberg and Namiesberg areas, describing skirmishes as 'genocidal' in nature. Dunn (1931) writes of a 'Gora' (or 'Gorra', '!Gora', or waterhole in the rock) near 'Ghaums' (or 'Gams'), stating that *'At this water an affray took place between the Boers and Bushmen. The Bushmen scherms, made of stones, still remain, as well as the marks of the bullets on the rocks'*. A further record of conflict between the 'trekboers' and the San was relayed in the Cape Argus, July 1973: *'Aggeneys is the name of a kloof on Vickie Burger's farm... Long before the turn of the century, the Bushmen had several strongholds in the mountains between Pofadder and Springbok and from these they carried out raids on the farmers. Finally the farmers could no longer tolerate the marauding Bushmen and formed a commando which followed the spoor of the Bushmen and the livestock that they had stolen to the kloof, which is today known as Aggeneys. Near the kloof they split into three parties which surrounded the trapped bushmen at a spring near the confluence of the three ravines. The Bushmen were wiped out and the kloof became known as The Place of Blood'*.

Fair records of LSA lithic deposits are present in archaeological CRM reports, with sites often being in lagged contexts and associated with earlier MSA deposits, again more than often identified on the peneplains but including small shelter sites. LSA sites are routinely described as small ephemeral scatters of lithic artefacts, with quartz being the primary raw material used for artefact production, and similar to described MSA assemblages, of a poor amorphous typology. Grinding grooves are frequently associated with LSA deposits, and a number of upper grinding stones have been recorded. Ostrich eggshell fragments and fine grit tempered ceramic have been found at select LSA sites. The micro-landscape seems to have been key in LSA site locality, with sites often reported on as situated in close proximity to a 'Gora' or waterhole (De Kock 2012; Morris 2010, 2011, 2013a, 2013b, 2013d; Orton 2015a, 2015b, 2016; Orton & Webley 2012; Webley & Halkett 2012, 2017a, 2017b, 2017c, 2017d). Morris (2013d) reported on a Rock Art site, situated at the foot of the Swartberg (Black Mountain) on the Farm Zuurwater, and Orton & Webley (2012) on a series of both hunter-gatherer and herder Rock Art shelters from the Kangnas study site, but the presence of Rock Art associated with LSA deposits remain notably low. A limited number of LSA sites yielded typical Colonial Period artefacts, including porcelain fragments, bottle glass and rusted enamel (Morris 2013d; Orton 2015a).

Morris (2013a) reported on a LSA site at an 'inkruip', a crevice to the southern side of Gamsberg, and interpreted the site as a 'genocide' site; most probably the site reported on by Dunn (1931). A word of caution is raised here with regards to the assignation of archaeological sites to historically reported on incidents. Whilst the site description by Morris provides for a confirmed LSA site, and the locale of the site reasonably coincides with that reported on by Dunn, the absence of the historically reported on bullet holes in Morris' text and photographic record remain concerning. It is suggested that

clear definition be given for sites described as 'genocide' sites, and that specific conflict related data, such as bullet holes, bullet casings etc. be collected that distinctly differentiates 'genocide' LSA sites from LSA occupation sites.

Records of grave sites are notably low. Orton (2016) reported on a possible grave, and Orton & Webley (2012) identified a number of Colonial Period family cemeteries associated directly with farmsteads, as well as infrequent stone cairn graves of Colonial Period assignment, while Webley & Halkett (2012) commented on a number of stone cairns present on the Aroams photovoltaic study site, which may or may not be graves. Stone cairns reported on are not georeferenced, though basic recommendations, in the event of these being graves, or graves being encountered during the course of development are included in the report recommendations. Webley & Halkett (2012) speculated that stone cairns identified may also be early prospecting remains. An alternative possibility for stone cairns on the landscape is offered; what is in the Eastern Cape referred to by the Xhosa name 'izivivane', small stone piles that marked the well-wishing of a journey. The practise is reasonably inferred to have been adopted by Later Iron Age (LIA) Xhosa groups after large scale migration into the Eastern Cape during the 18th Century and the associated displacement and marginalization of resident Khoe groups. Demarcation of migration or travel routes have been reported on amongst various LSA (and LIA) indigenous populations. It needs to be noted that stone cairn graves across 'Bushmanland' may be Khoe graves, with the Khoe known to have periodically ventured into 'Bushmanland', or even Colonial Period graves, but non-Christened LSA hunter-gatherer graves would by virtue of cultural tradition not be surface demarcated.

As mentioned, by 1770 Colonial 'trekboers' moved into the area, essentially living a transhumance existence, a lifestyle that dominated Western Colonial Period occupation of 'Bushmanland' well into the first third of the 20th Century. By 1930 the development of drilling technology allowed the exploitation of sub-surface water resources, boreholes and the characteristic wind pump on the landscape marking the first permanent farming, and associated therewith permanent settlement of farmers in the area (Beaumont *et. al.* 1995). Mineral exploration of the greater area is fairly recent, dating back to 1928 in the Aggeneys area. By 1850 copper mining started in Springbok and the area became not only nationally, but internationally renowned. From the 1970s onwards mining of varying mineral deposits started to play a role in the economic sector of the region (Webley & Halkett 2017e).

With reference to the above, typical Colonial Period sites reported on in archaeological CRM reports remain scarce. Morris (2011) recorded a portion of the old Springbok-Aggeneys-Pofadder road with periodic cast cement milestones still visible (and associated with a fair degree of period related debris, including bottle glass and metal cans). A packed stone walled feature on the Farm Zuurwater can reasonably be ascribed to the Colonial Period (Morris 2013b). Boer War fortifications are still visible in the Aggeneys area (Webley & Halkett 2017e), and low-keyed mining / prospecting impact have been reported on Webley & Halkett (2012). Birkholtz (2016) reported on a number of Colonial Period farmstead, as did Orton & Webley (2012), with these described as fairly late dating to the late 1800s / early 1900s, and in cases associated with family cemeteries.

Farms Haramoep, Oonab, Amam and Nooisabes: Chief Surveyor General (CSG) records (SD diagrams) could be obtained from the relevant directorate for the farms Haramoep 53, Oonab-Noord 609 (originally part of the Farm Oonab 52) and Amam 46, though no CSG record could be obtained for the Farm Nooisabes 51. The farms Haramoep 53, Oonab 52 and Amam 46 were all first registered in 1894, with Oonab-Noord 609 subdivided from Oonab 52 in 1960. It can reasonably be inferred that the Farm Nooisabes 51 was also registered in 1894, or the years immediately before or after 1894.

Farm names, Haramoep, Oonab, Amam and Nooisabes are all inferred to be of Khoe origin, however the meanings of the names are not recorded or known (Nienaber & Raper 1977).

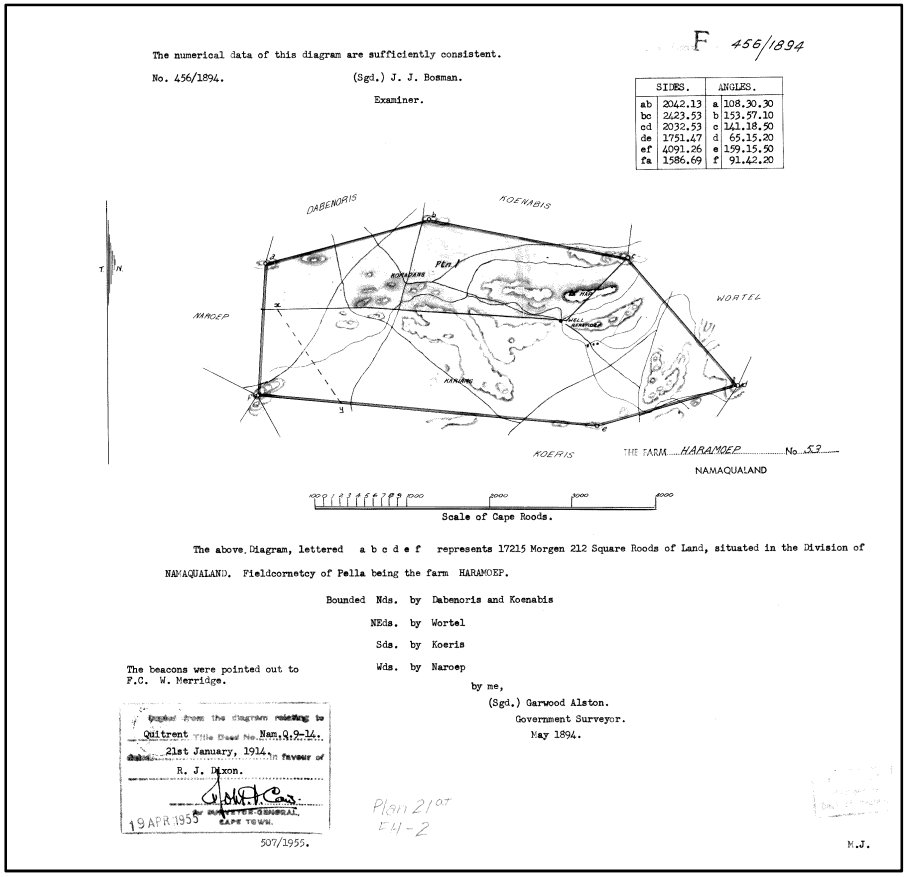


Figure 1: Early SD diagram of the registration of Farm Haramoep 53, 1894 (CSG Record number: 456 / 1894)

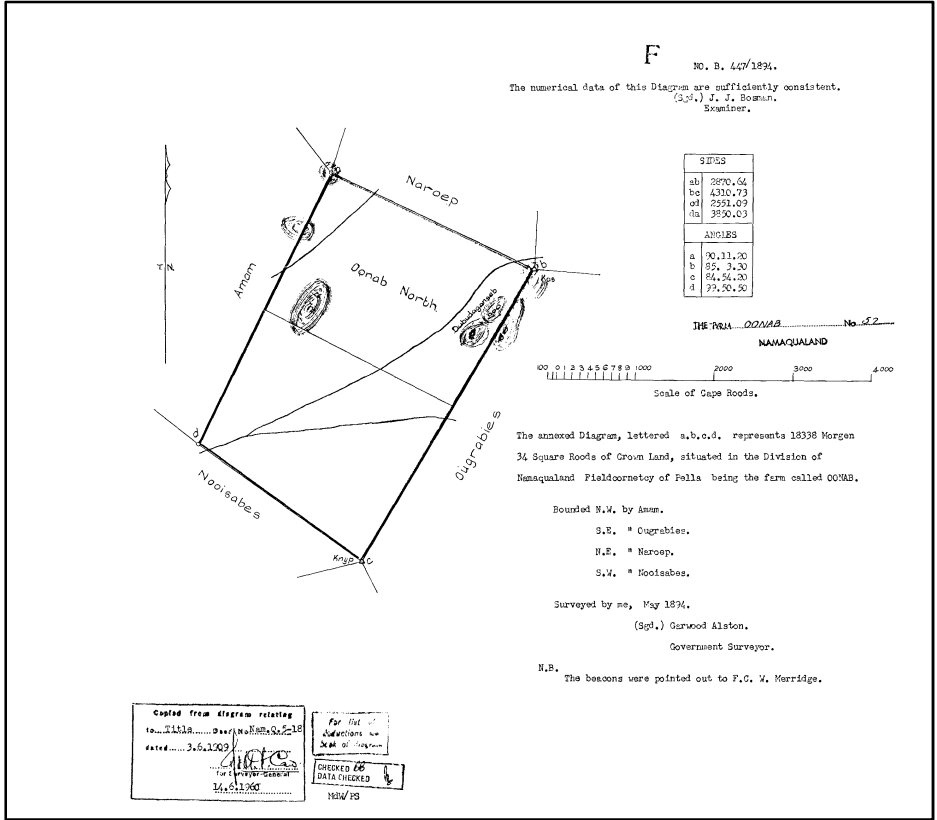


Figure 2: Subdivision of the Farm Oonab-Noord 609 from Oonab 52, 1960, originally registered as the Farm Oonab in 1894 (CSG Record number: 447 / 1894)

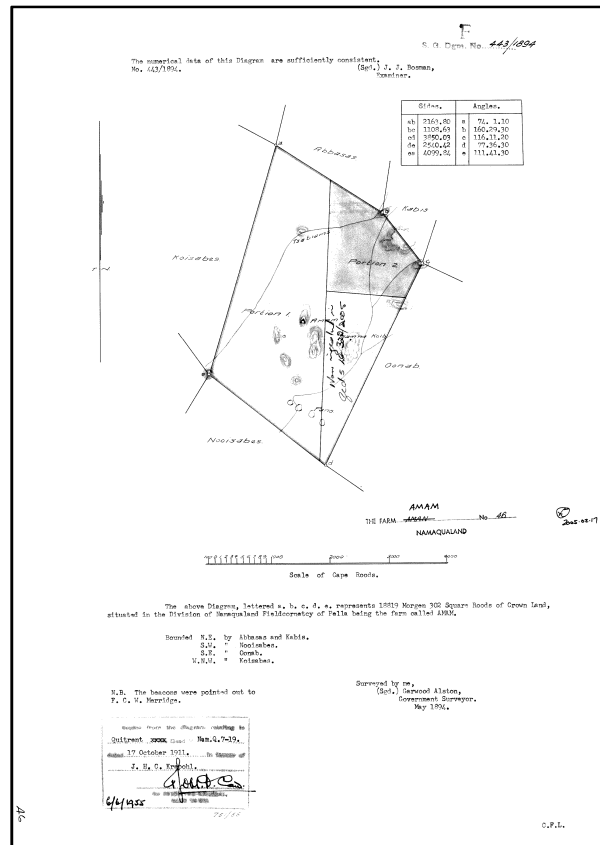


Figure 3: Early SD diagram of the registration of Farm Amam 46, 1894 (CSG Record number: 443 / 1894)

6.2) Field Assessment

The Koa Valley prospecting is proposed by means of a phased approach, including a desktop study, geological field mapping, semi-regional geophysical ground based survey and invasive techniques, including assaying and drilling. Only the impact of invasive techniques is to be considered with reference to requirements of the NHRA 1999. The impact of assaying, rock chip and soil sample collection, is negligible with reference to the recorded archaeological and cultural heritage of the greater terrain. The Phase 1 AIA focussed on field assessment of the thirty-four (34) proposed drill positions. Drill positions are proposed situated on the peneplains and within the Koa Valley dune system, with both of these areas having proven to be of no to low archaeological significance. Low density MSA and LSA artefacts are present in surface gravel lenses, as has been identified at drill positions BH0221 (Site KOA-01) and BH031 (Site KOA-02) on the south-eastern peneplain of Harmoep. Similar type anthropogenic lenses have been identified elsewhere, on the peneplains of Harmoep and Nooisabes, but with these not affected by the proposed drill positions. At drill position BH0071 (Site KOA-04) low density MSA and LSA artefacts were found a workshop context, indicating that more mountainous areas may well be, from a Stone Age archaeological point of view, more significant than the peneplains. Site KOA-03 represents the Colonial Period Harmoep farmstead.

Two (2) drill positions were not accessed, including BH0111 and BH0081, due to accessibility constraints. Both drill positions are situated in the Koa Valley dune system. It is recommended that development (drilling) at the locales proceed, based on the assumption that the Koa Valley dune system is largely anthropogenically sterile, as has been identified at nine (9) drill positions proposed and assessed, situated in the dune system.

6.2.1) Harmoep 53

Drill positions BH0221, BH0231, BH031 and BH032 are situated on a peneplain to the south-east of the Harmoep inselberg. The peneplain is characterised by low density scatters of MSA and LSA lithic artefacts in surface gravel lenses. Gravel lenses containing artefacts are intersected by vast areas of anthropogenic sterile red Hutton sands. Lithic deposits

across the greater BH0221, BH0231, BH031 and BH032 peneplain are archaeologically insignificant. Site KOA-03 is situated in close proximity to the BH0221, BH0231, BH031 and BH032 cluster of drill positions and comprises the Colonial Period Haramoep farmstead.

The BH037, BH0251, BH035 and BH036 cluster of drill positions are situated towards the north of the Haramoep inselberg, on an anthropogenic sterile red Hutton sand peneplain. High rising quartz and quartzite outcrops surrounding the peneplain serve as indicators of a potential archaeological landscape, but development in this area poses no threat to any identified archaeological resources.

The BH0201, BH038, BH0191 and BH0211 cluster of drill positions are situated to the east of the Haramoep inselberg, in a red Hutton sand dune system, or the Koa dune system, the very dune system that afforded the Koa Valley its name. The Koa dune system proved to be anthropogenically sterile.

Towards the south-west of the Haramoep inselberg drill positions BH034, BH0241 and BH033 are again situated on a peneplain with intersecting anthropogenic surface gravel lenses and sterile red sand; the peneplain thus very similar in character to the BH0221, BH0231, BH031 and BH032 peneplain. None of the drill positions are situated on gravel lenses, and intersecting anthropogenic gravel lenses are archaeologically insignificant.

6.2.1.1) Drill Position BH0221 / Site KOA-01 – MSA and LSA Lithic Scatter – S29.12480°; E18.73461°

The drill position BH0221 / Site KOA-01 area is characterised by a low density lithic artefact scatter in the surface gravel lens. Artefacts are typologically classed as Volman (1984) MSA3 and a macrolithic LSA, with artefacts produced mainly from local quartz. Artefact ratios (artefacts: m²) across the low density lithic occurrence are notably low, with ratios of 1-5: 1 recorded.

- **Site Significance and Recommendations:** The Site KOA-01 anthropogenic gravel lens comprises a Stone Age archaeological site / occurrence, and is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. Lithic deposits at the occurrence are archaeologically insignificant. It is recommended that development proceed without the developer having to comply with additional heritage compliance recommendations.

6.2.1.2) Drill Position BH0231 – S29.12154°; E18.73901°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.1.3) Drill Position BH031 / Site KOA-02 – MSA and LSA Lithic Scatter – S29.11841°; E18.73877°

Drill position BH031 / Site KOA-02 is situated on a gravel lens containing amorphous Volman (1984) MSA 3 and macrolithic LSA artefacts, with raw material use and artefact ratios similar to that recorded at the BH0221 / Site KOA-01 low density lithic occurrence.

- **Site Significance and Recommendations:** The Site KOA-02 low density Stone Age lithic occurrence is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. Lithic deposits at the occurrence are archaeologically insignificant. It is recommended that development proceed without the developer having to comply with additional heritage compliance recommendations.

6.2.1.4) Drill Position BH0232 – S29.11834°; E18.73432°

Infrequent, mainly quartz MSA and LSA artefacts are present across the surface of the site, with artefact ratios (artefacts: m²) too low to be recorded.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.1.5) Site KOA-03 – Colonial Period Farmstead – S29.10819°; E18.73847°

Site KOA-03 comprises the well conserved Colonial Period Farm Haramoep 53 farmstead, including the main residence and related outbuildings, situated immediately adjacent to the access road. The site is at present fenced with an access gate, complying with SAHRA minimum site conservation standards. The Colonial Period Haramoep 53 farmstead, a vernacular structure, may well be in the region of 100 years old.

- **Site Significance and Recommendations:** Site KOA-03 comprise a heritage site (structure older than 60 years of age) and is formally protected by the NHRA 1999. The site receives automatic SAHRA protection as a site of *High Significance* with a *Provincial Grade II Field Rating*. Formal conservation measures complying with SAHRA minimum site conservation standards are in place. The developer need not comply with additional conservation requirements prior to, or during the development.

6.2.1.6) Drill Position BH037 – S29.08819°; E18.69961°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.1.7) Drill Position BH0251 – S29.09008°; E18.69597°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.1.8) Drill Position BH035 – S29.08795°; E18.69088°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.1.9) Drill Position BH036 – S29.08812°; E18.68613°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.1.10) Drill Position BH0201 – S29.10016°; E18.63323°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.1.11) Drill Position BH038 – S29.09565°; E18.63349°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.1.12) Drill Position BH0191 – S29.10076°; E18.62511°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.1.13) Drill Position BH0211 – S29.10531°; E18.62675°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.1.14) Drill Position BH034 – S29.11733°; E18.66927°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.1.15) Drill Position BH0241 – S29.12167°; E18.67151°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.1.16) Drill Position BH033 – S29.12501°; E18.67171°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.2) Oonab-Noord 609

A single drill position is proposed on the property Oonab-Noord, situated in the Koa Valley dune system. Similar to findings of the Koa Valley system on Haramoep, the dune system on Oonab-Noord proved to be anthropogenically sterile.

6.2.2.1) Drill Position BH0161 – S29.14523°; E18.51078°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.3) Amam 46

Drill positions BH0151, BH0181, BH0171, BH0141, BH0131 and BH0121 are situated scattered among the Amamkop inselbergs, intersected by Koa Valley red Hutton sand dunes and a complex system of drainage lines and dry vleilands. Though no Sone Age archaeology will be affected, selected of the inselbergs may well have been used as low keyed raw material sources during Palaeolithic times.

6.2.3.1) Drill Position BH0151 – S29.14541°; E18.43177°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.3.2) Drill Position BH0181 – S29.14411°; E18.42902°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.3.3) Drill Position BH0171 – S29.14760°; E18.40838°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.3.4) Drill Position BH0141 – S29.15541°; E18.40501°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.3.5) Drill Position BH0131 – S29.15845°; E18.40228°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.3.6) Drill Position BH0121 – S29.16164°; E18.39675°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.4) Nooisabes 51

Twelve (12) drill positions are proposed on the Farm Nooisabes, two (2) of which were not subjected to Phase 1 AIA field assessment including BH0111 and BH0081, due to accessibility constraints. Drill positions BH0111 and BH0081 are both situated in the Koa Valley dune system. It is recommended that development (drilling) at the locales proceed, based on

the assumption that the Koa Valley dune system is largely anthropogenically sterile, as has been identified at nine (9) drill positions proposed and assessed, situated in the dune system.

Infrequent surface gravel lenses, containing low densities of MSA and LSA lithic artefacts do feature on the Hutton sand peneplain of Nooisabes, in character and artefact typology very similar to low density Stone Age lithic scatters identified on Haramoep, though none of the proposed Nooisabes drill positions will impact on such lenses. All drill positions proposed on the peneplain of Nooisabes are situated in areas of anthropogenic sterile red Hutton sands.

Drill position BH0071 is situated on the peneplain, at the foot of a quartz outcrops, a part of the Nooisabes mountain range. MSA and LSA artefacts characterizing the quartz outcrops in a quarry / workshop context (Site KOA-04) indicate that the more mountainous areas may well be, from a Stone Age archaeological point of view, more significant than the peneplains of the greater terrain.

6.2.4.1) Drill Position BH0111 – S29.18516°; E18.37902°

Drill position BH0111 was not assessed.

- **Site Significance and Recommendations:** Development to proceed as applied for (based on the assumption that the Koa Valley dune system is anthropogenically sterile).

6.2.4.2) Drill Position BH0081 – S29.19210°; E18.36837°

Drill position BH0081 was not assessed.

- **Site Significance and Recommendations:** Development to proceed as applied for (based on the assumption that the Koa Valley dune system is anthropogenically sterile).

6.2.4.3) Drill Position BH039 – S29.19651°; E18.39073°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.4.4) Drill Position BH0091 – S29.19867°; E18.39330°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.4.5) Drill Position BH0061 – S29.21853°; E18.37181°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.4.6) Drill Position BH0051 – S29.22112°; E18.36583°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.4.7) Drill Position BH0041 – S29.21996°; E18.36093°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.4.8) Drill Position BH0031 – S29.22201°; E18.36096°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.4.9) Drill Position BH0021 – S29.22100°; E18.35507°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.4.10) Drill Position BH0011 – S29.22130°; E18.35010°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.4.11) Drill Position BH0101 – S29.22585°; E18.34233°

No heritage resources identified.

- **Site Significance and Recommendations:** Development to proceed as applied for.

6.2.4.12) Drill Position BH0071 / Site KOA-04 – MSA and LSA Workshop Lithic Scatter – S29.23079°; E18.35581°

The drill position BH0071 / Site KOA-04 MSA and LSA lithic scatter characterizes the peneplain on which the drill position is situated as well as the quartz outcrops, the raw material source. Artefacts are found across the area in typical workshop context, with quartz from the outcrops having been sourced to produce artefacts. The MSA is ascribed to a Volman (1984) MSA2 and MSA3, based on flake size, while the LSA is represented by a macrolithic industry. Typologically artefacts are extremely crude, with both assemblages, found in lagged context on the surface of the outcrops and peneplain, comprising primarily of amorphous flakes and cores. Artefact ratios (artefacts: m²) across the area are varying, but fairly high, with ratios of 5-25: 1 recorded.

- **Site Significance and Recommendations:** The Site KOA-04 MSA and LSA lithic scatter found in a typical workshop context at the raw material source utilized for artefact production comprises a Stone Age archaeological site, as defined and protected by the NHRA 1999. The site is ascribed a SAHRA *Low Significance* and a *Generally Protected IV-C Field Rating*. Drilling at drill position BH0071 will directly impact on the identified Site KOA-04 archaeological lithic occurrence. Based on the small impact footprint of drilling versus the extensive lithic occurrence size it is recommended that drilling proceed without the developer having to comply with additional heritage compliance recommendations.



Plate 1: General view of BH0221 / KOA-01



Plate 3: General view of BH0231



Plate 2: Lithic artefacts from Site KOA-01



Plate 4: General view of BH031 / KOA-02



Plate 5: Lithic artefacts from Site KOA-02



Plate 7: The Site KOA-03 farmstead



Plate 6: General view of BH032



Plate 8: General view of BH037



Plate 9: General view of BH0251



Plate 11: General view of BH036



Plate 10: General view of BH035



Plate 12: General view of BH0201



Plate 13: General view of BH038



Plate 15: General view of BH0211



Plate 14: General view of BH0191



Plate 16: General view of BH034



Plate 17: General view of BH0241



Plate 19: General view of BH0161



Plate 18: General view of BH033



Plate 20: General view of BH0151



Plate 21: General view of BH0181



Plate 23: General view of BH0141



Plate 22: General view of BH0171



Plate 24: General view of BH0031



Plate 25: General view of BH0021



Plate 27: General view of BH0091



Plate 26: General view of BH039



Plate 28: General view of BH0061



Plate 29: General view of BH0051



Plate 31: General view of BH0031



Plate 30: General view of BH0041



Plate 32: General view of BH0021



Plate 33: General view of BH0011



Plate 35: General view of BH0071



Plate 34: General view of BH0101



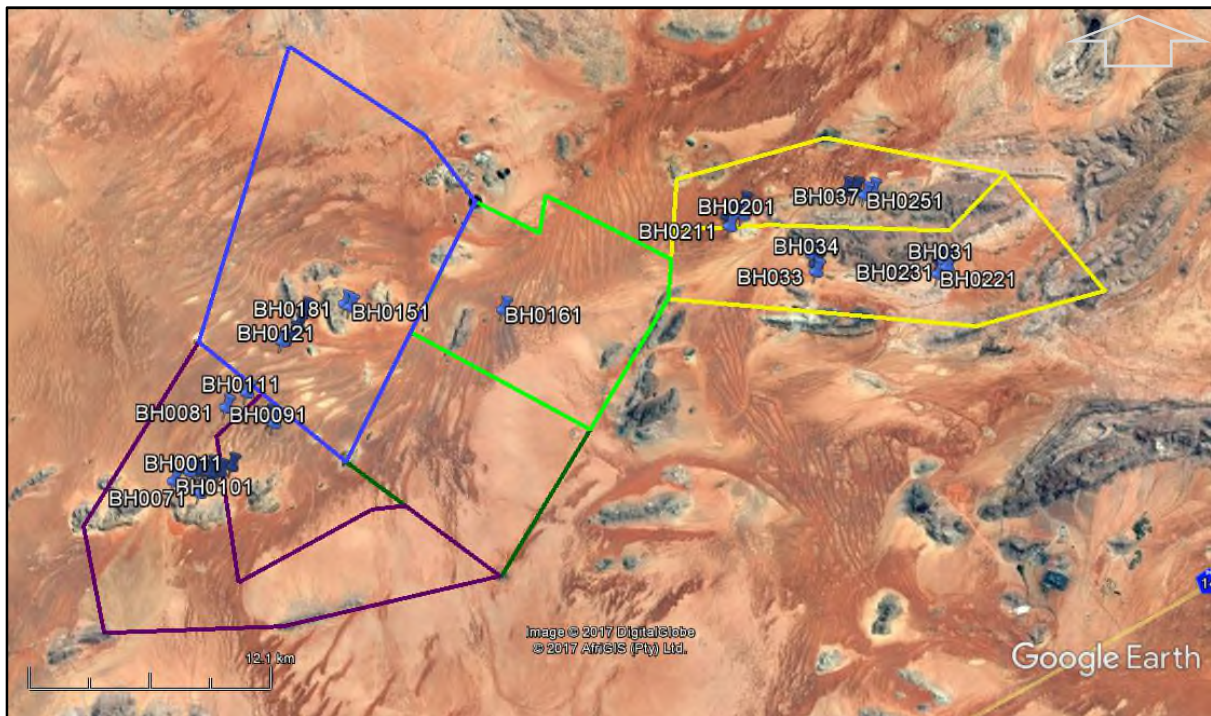
Plate 36: Lithic artefacts from BH0071

7 – Consideration of Related / Significant Aspect Management Plans in the Area

The proposed Koa Valley Black Mountain Mining prospecting application study site does not overlap, in whole or in part, any known declared conservation area or formal heritage conservation initiative with a heritage management plan that directly affects, in whole or in part, any of the properties Farms Haramoep 53, Oonab-Noord 609, Amam 46 or Nooisabes 51.

1. A prospecting / mining development application, submitted on SAHRIS as SAHRIS CaseID 1561, affects a series of farms and farm portions, including Nooisabes 51.
2. Public Participation Process (PPP) notifications of intent to develop were displayed at the time of the archaeological field assessment for an independent diamond prospecting application on the Farm Amam 46 Portion 5.

Should the applications be approved, relevant heritage management recommendations may affect the Koa Valley prospecting on Farms Nooisabes 51 and Amam 5/46. In the event of construction phases of development applications overlapping it is advised that developers familiarize themselves with basic Management Plans and procedures of the other developments.



Map 5: The Koa Valley prospecting application area, indicating the localities of the 34 proposed drill positions (courtesy Alan Johnson, Black Mountain Mining)



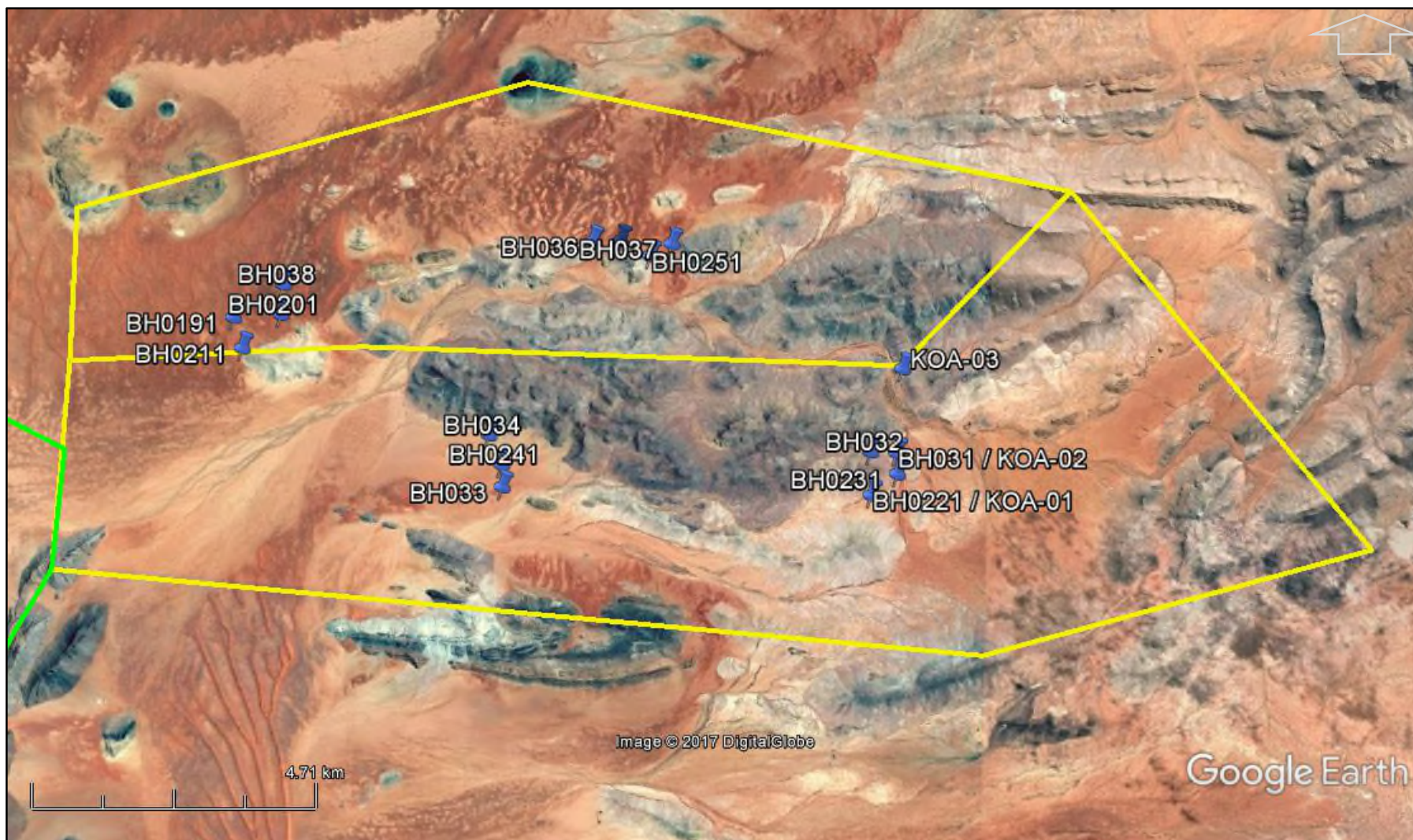
Plate 37: General view of the Koa Valley dune system, Haramoep 53



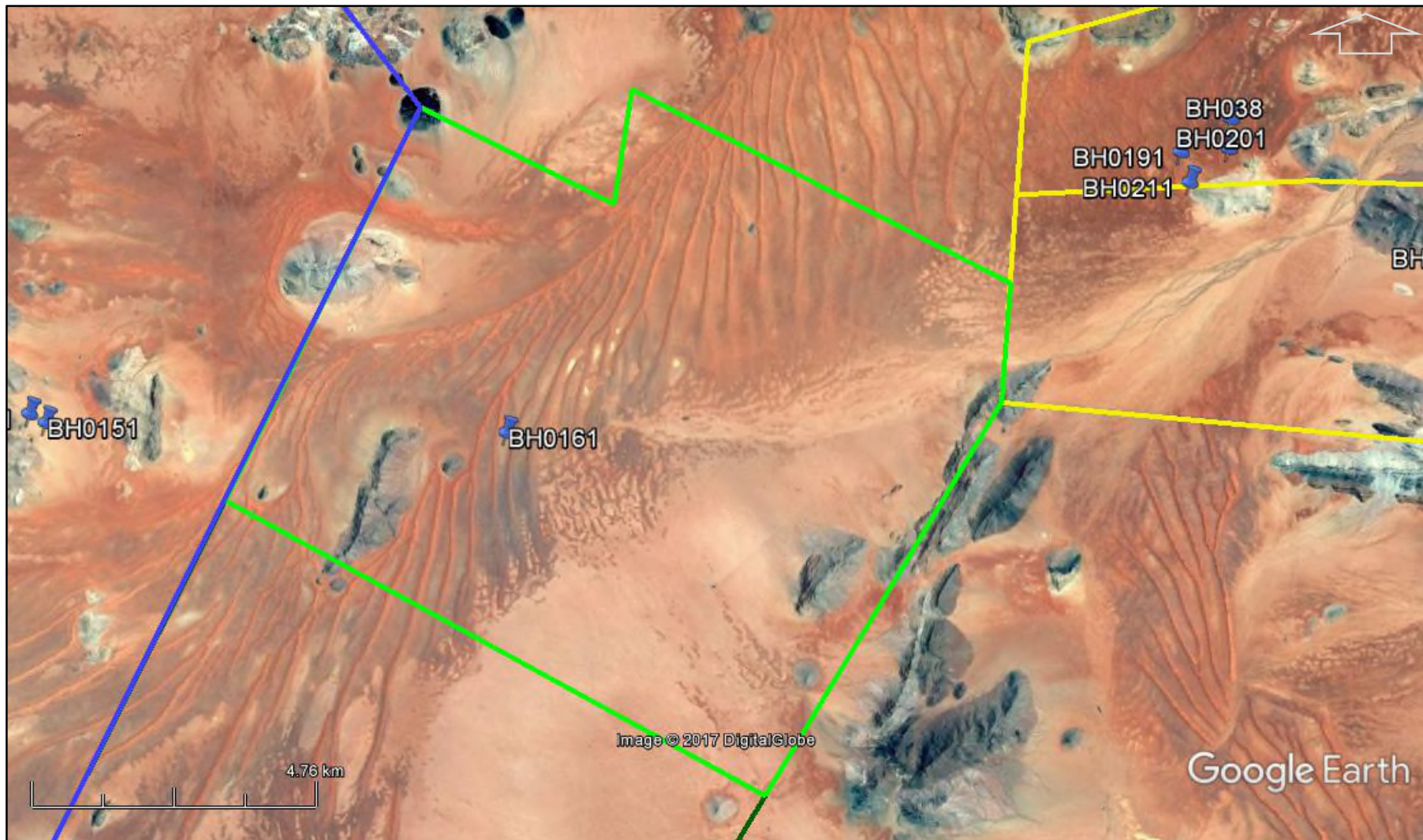
Plate 38: General view of the Amamkop inselbergs, Amam 46



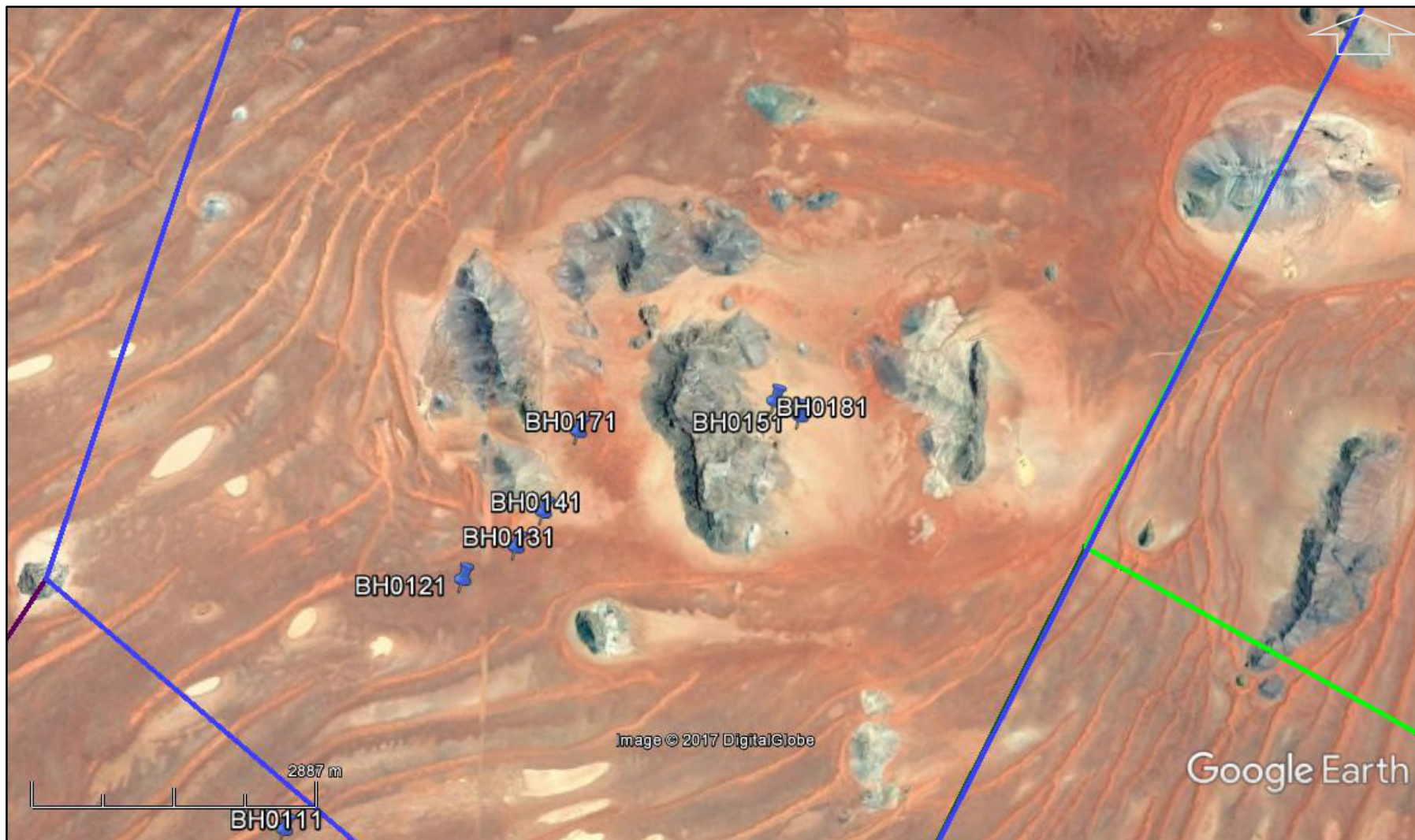
Plate 39: View of the Hutton sand peneplain with the Nooisabes mountains in the background, Nooisabes 51



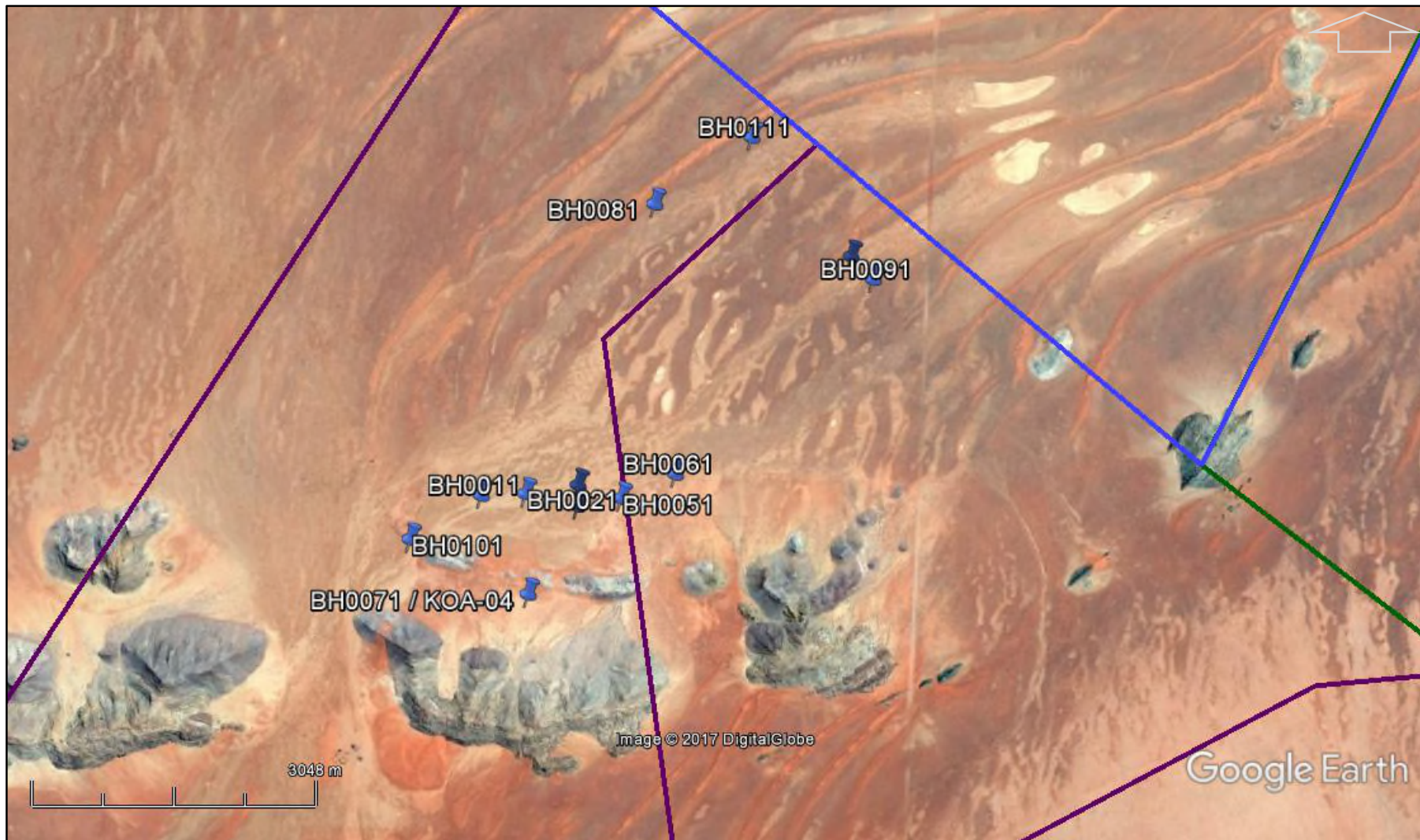
Map 6: Koa Valley drill positions on Haramoep 53 and indicating the localities of the BH0221 / KOA-01071 and BH031 / KOA-02 Stone Age lithic scatters and the Site KOA-03 Colonial Period farmstead



Map 7: Koa Valley drill position on Oonab-Noord 609 (no heritage resources were identified on Oonab-Noord)



Map 8: Koa Valley drill positions on Amam 46 (no heritage resources were identified on Amam)



Map 9: Koa Valley drill positions on Nooisabes 51 and indicating the locality of the BH0071 / KOA-04 Stone Age lithic scatter

9 – Environmental Impact Rating

Environmental impact rating of identified heritage resources is done according to the system used by EIMS, as described in the NEMA 1998, EIA Regulations (2010).

Environmental Impact Assessment Rating: Sites KOA-01, KOA-02 and KOA-04					
Impact Name	Drilling impact on identified lithic scatters				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	-1	-1	Magnitude	1	1
Extent	2	2	Reversibility	3	1
Duration	1	5	Probability	5	4
Environmental Risk (Pre-mitigation)				-1.75	
Mitigation Measures:					
Drilling impact on identified lithic scatters recommended without the developer having to comply with additional heritage compliance requirements					
Environmental Risk (Post-mitigation)				-2.25	
Degree of confidence in impact prediction				High	
Impact Prioritisation:					
Public Response				0 (N/A)	
Low: Issue not raised in public responses					
Cumulative Impacts				1	
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources				2	
Medium: Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.					
Prioritisation Factor				+3	
Final Significance				+1 (Low)	

Table 4: Environmental Impact Assessment rating for Sites KOA-01, KOA-02 and KOA-04

Environmental Impact Assessment Rating: Site KOA-03					
Impact Name	Conservation				
Environmental Risk					
Attribute	Pre-mitigation	Post-mitigation	Attribute	Pre-mitigation	Post-mitigation
Nature	-1	+1	Magnitude	2	1
Extent	2	2	Reversibility	3	1
Duration	1	2	Probability	5	4
Environmental Risk (Pre-mitigation)				-2	
Mitigation Measures:					
Temporary heritage signage during the construction (drilling) phase					
Environmental Risk (Post-mitigation)				+1.5	
Degree of confidence in impact prediction				High	
Impact Prioritisation:					
Public Response				0 (N/A)	
Low: Issue not raised in public responses					
Cumulative Impacts				1	
Low: Considering the potential incremental, interactive, sequential, and synergistic cumulative impacts, it is unlikely that the impact will result in spatial and temporal cumulative change.					
Degree of potential irreplaceable loss of resources				2	
Medium: Where the impact may result in the irreplaceable loss (cannot be replaced or substituted) of resources but the value (services and/or functions) of these resources is limited.					
Prioritisation Factor				+3	
Final Significance				+1 (Low)	

Table 5: Environmental Impact Assessment rating for Site KOA-03

Archaeological and Cultural Heritage Impact Assessment (AIA) – Heritage Protocol for Incidental Finds during the Construction (Drilling) and Operational or Use Phases

Should any palaeontological, archaeological or cultural heritage resources, including human remains / graves, as defined and protected by the NHRA 1999, and not reported on in this report, be identified during the construction (drilling) phase of development, it is recommended that the process described below be followed.

➤ On-site Reporting Process:

1. The identifier should immediately notify his / her supervisor of the find.
2. The identifier's supervisor should immediately (and within 24 hours after reporting by the identifier) report the incident to the on-site SHE / SHEQ officer.
3. The on-site SHE / SHEQ officer should immediately (and within 24 hours after reporting by the relevant supervisor) report the incident to the appointed ECO / ELO officer. [Should the find relate to human remains the SHE / SHEQ officer should immediately notify the nearest SAPS station informing them of the find].
4. The ECO / ELO officer should ensure that the find is within 72 hours after the SHE / SHEQ officers report reported on SAHRIS and that a relevant heritage specialist is contacted to make arrangements for a heritage site inspection. [Should the find relate to human remains the ECO / ELO officer should ensure that the archaeological site inspection coincides with a SAPS site inspection, to verify if the find is of forensic, authentic (informal / older than 60 years), or archaeological (older than 100 years) origin].
5. The appointed heritage specialist should compile a 'heritage site inspection' report based on the site-specific findings. The site inspection report should make recommendations for the destruction, conservation or mitigation of the find and prescribe a recommended way forward for development. The 'heritage site inspection' report should be submitted to the ECO / ELO, who should ensure submission thereof on SAHRIS.
6. SAHRA / the relevant PHRA will state legal requirements for development to proceed in the SAHRA / PHRA Comment on the 'heritage site inspection' report.
7. The developer should proceed with implementation of the SAHRA / PHRA Comment requirements. SAHRA / PHRA Comment requirements may well stipulate permit specifications for development to proceed.
 - Should permit specifications stipulate further Phase 2 archaeological investigation (including grave mitigation) a suitably accredited heritage specialist should be appointed to conduct the work according to the applicable SAHRA / PHRA process. The heritage specialist should apply for the permit. Upon issue of the SAHRA / PHRA permit the Phase 2 heritage mitigation program may commence.
 - Should permit specifications stipulate destruction of the find under a SAHRA / PHRA permit the developer should immediately proceed with the permit application. Upon the issue of the SAHRA / PHRA permit the developer may legally proceed with destruction of the palaeontological, archaeological or cultural heritage resource.
 - Upon completion of the Phase 2 heritage mitigation program the heritage specialist will submit a Phase 2 report to the ECO / ELO, who should in turn ensure submission thereof on SAHRIS. Report recommendations may include that the remainder of a heritage site be destroyed under a SAHRA / PHRA permit.
 - Should the find relate to human remains of forensic origin the matter will be directly addressed by the SAPS: A SAHRA / PHRA permit will not be applicable.

NOTE: Note that SAHRA / PHRA permit and process requirements relating to the mitigation of human remains requires suitable advertising of the find, a consultation, mitigation and re-internment / deposition process.

➤ Duties of the Supervisor:

1. The supervisor should immediately upon reporting by the identifier ensure that all work in the vicinity of the find is ceased.
2. The supervisor should ensure that the location of the find is immediately secured (and within 12 hours of reporting by the identifier), by means of a temporary conservation fence (construction netting) allowing for a 5-10m heritage conservation buffer zone around the find. The temporary conserved area should be sign-posted as a 'No Entry – Heritage Site' zone.
3. Where development has impacted on the resource, no attempt should be made to remove artefacts / objects / remains further from their context, and artefacts / objects / remains that have been removed should be collected and placed within the conservation area or kept for safekeeping with the SHE / SHEQ officer. It is imperative that where development has impacted on palaeontological, archaeological and cultural heritage resources the context of the find be preserved as good as possible for interpretive and sample testing purposes.
4. The supervisor should record the name, company and capacity of the identifier and compile a brief report describing the events surrounding the find. The report should be submitted to the SHE / SHEQ officer at the time of the incident report.

➤ **Duties of the SHE / SHEQ Officer:**

1. The SHE / SHEQ officer should ensure that the location of the find is recorded with a GPS. A photographic record of the find (including implementation of temporary conservation measures) should be compiled. Where relevant a scale bar or object that can indicate scale should be inserted in photographs for interpretive purposes.
2. The SHE / SHEQ officer should ensure that the supervisors report, GPS co-ordinate and photographic record of the find be submitted to the ECO / ELO officer. [Should the find relate to human remains the SHE / SHEQ officer should ensure that the mentioned reporting be made available to the SAPS at the time of the incident report].
3. Any retrieved artefacts / objects / remains should, in consultation with the ECO / ELO officer, be deposited in a safe place (preferably on-site) for safekeeping.

➤ **Duties of the ECO / ELO officer:**

1. The ECO / ELO officer should ensure that the incident is reported on SAHRIS. (The ECO / ELO officer should ensure that he / she is registered on the relevant SAHRIS case with SAHRIS authorship to the case at the time of appointment to enable heritage reporting).
2. The ECO / ELO officer should ensure that the incident report is forwarded to the heritage specialist for interpretive purposes at his / her soonest opportunity and prior to the heritage site inspection.
3. The ECO / ELO officer should facilitate appointment of the heritage specialist by the developer / construction consultant for the heritage site inspection.
4. The ECO / ELO officer should facilitate access by the heritage specialist to any retrieved artefacts / objects / remains that have been kept in safekeeping.
5. The ECO / ELO officer should facilitate coordination of the heritage site inspection and the SAPS site inspection in the event of a human remains incident report.
6. The ECO / ELO officer should facilitate heritage reporting and heritage compliance requirements by SAHRA / the relevant PHRA, between the developer / construction consultant, the heritage specialist, the SHE / SHEQ officer (where relevant) and the SAPS (where relevant).

➤ **Duties of the Developer / Construction Consultant:**

The developer / construction consultant should ensure that an adequate heritage contingency budget is accommodated within the project budget to facilitate and streamline the heritage compliance process in the event of identification of incidental palaeontological, archaeological and cultural heritage resources during the course of development, including as a norm during vegetation clearing, surface scraping, trenching and excavation phases, when resources not visible at the time of the surface assessment may well be exposed.

Simplified Guide to the Identification of Archaeological Sites:

- ❖ **Stone Age** – Knapped stone display flakes and flake scars that appear unnatural and may result in similar type ‘shaped’ stones often concentrated in clusters or forming a distinct layer in the geological stratigraphy. ESA shapes may represent ‘pear’ or oval shaped stones, often in the region of 10cm or larger. Typical MSA types include blade-like or rough triangular shaped artefacts, often associated with randomly shaped lithics or flakes that display use- or edge-wear around the rim of the artefact. LSA types are similar to MSA types, but generally smaller (≤ 3 cm in size), often informally shaped, and are frequently found in association with bone, pieces of charcoal, ceramic shards and food remains.
 - **Rock Art** – Includes both painted and engraved images.
 - **Shell Middens** – Include compact shell lenses that may be quite extensive in size or small ephemeral scatters of shell food remains, often associated with LSA artefact remains, but may also be of MSA and Iron Age cultural association.
- ❖ **Iron Age** – Iron Age sites are often characterized by stone features, i.e. the remains of former livestock enclosures or typical household remains; huts are identified by either mound or depression hollows. Typical artefacts include ceramic remains, farming equipment, beads and trade goods, metal artefacts (including jewellery) etc. Remains of the ‘Struggle’ – events, histories and landmarks associated therewith are often, based on cultural association, classed as part of the Iron Age heritage of South Africa.
- ❖ **Colonial Period** – Built environment remains, either urban or rural, are of a Western cultural affiliation with typical artefacts representing early Western culture, including typical household remains, trade and manufactured goods, such as old bottle, porcelain and metal artefacts. War memorial remains, including the vast array of associated graves and the history of the Industrial Revolution form important parts of South Africa’s Colonial Period heritage.

With reference to archaeological and cultural heritage compliance, as per the requirements of the NHRA 1999, it is recommended that the proposed *Koa Valley Prospecting Right Application (without Bulk Sampling), Portions of the Farms Haramoep 53, Oonab-Noord 609, Amam 46 and Nooisabes 51, near Springbok / Aggeneys, Namakwa District Municipality, Northern Cape*, proceed as applied for, provided the developer comply with the below listed heritage recommendations.

The Phase 1 AIA focussed on field assessment of the thirty-four (34) proposed drill positions. Drill positions are proposed situated on the peneplains and within the Koa Valley dune system, with both of these areas having proven to be of no to low archaeological significance. Low density MSA and LSA artefacts are present in surface gravel lenses, as has been identified at drill positions BH0221 (Site KOA-01) and BH031 (Site KOA-02) on the south-eastern peneplain of Haramoep. Similar type anthropogenic lenses have been identified elsewhere, on the peneplains of Haramoep and Nooisabes, but with these not affected by the proposed drill positions. At drill position BH0071 (Site KOA-04) low density MSA and LSA artefacts were found a workshop context, indicating that more mountainous areas may well be, from a Stone Age archaeological point of view, more significant than the peneplains. Site KOA-03 represents the Colonial Period Haramoep farmstead.

Two (2) drill positions were not accessed, including BH0111 and BH0081, due to accessibility constraints. Both drill positions are situated in the Koa Valley dune system. It is recommended that development (drilling) at the locales proceed, based on the assumption that the Koa Valley dune system is largely anthropogenically sterile, as has been identified at nine (9) drill positions proposed and assessed, situated in the dune system.

- The proposed development poses no 'fatal flaws' with reference to archaeological and cultural heritage resources.
- Consideration of a 'No-Go' option is irrelevant with reference to identified archaeological and cultural heritage resources.
- The development will have a limited negative visual impact on the cultural landscape during the construction (drilling) phase; there will be no visual impact during the operational phase.
- Proposed prospecting will not result in a negative cumulative impact on the cultural landscape, during either the construction (drilling) or operational phases.
- [A future mining application, resulting from the prospecting application, may have a more direct impact on archaeological resources as well as a visual and cumulative impact on the cultural landscape].
- [In the event of any incidental archaeological and cultural heritage resources, as defined and protected by the NHRA 1999, being identified during the course of development, and not reported on in this report, the process described in '10) Heritage Management Plan' should be followed.]

Heritage Compliance Summary – Koa Valley Prospecting Right Application (without Bulk Sampling), Portions of the Farms Haramoep 53, Oonab-Noord 609, Amam 46 and Nooisabes 51, near Springbok / Aggeneys, Namakwa District Municipality, Northern Cape				
Drill Location	Site Number	Site Description	Co-ordinates	Recommendations
Haramoep 53				
BH0221	Site KOA-01	MSA & LSA lithic scatter	S29.12480°; E18.73461°	N/A (Lithic scatter archaeologically insignificant)
BH0231	-	-	S29.12154°; E18.73901°	N/A
BH031	Site KOA-02	MSA & LSA lithic scatter	S29.11841°; E18.73877°	N/A (Lithic scatter archaeologically insignificant)
BH032	-	-	S29.11834°; E18.73432°	N/A
-	Site KOA-03	Colonial Period farmstead	S29.10819°; E18.73847°	Formal heritage conservation measures in place
BH037	-	-	S29.08819°; E18.69961°	N/A
BH0251	-	-	S29.09008°; E18.69597°	N/A
BH035	-	-	S29.08795°; E18.69088°	N/A
BH036	-	-	S29.08812°; E18.68613°	N/A
BH0201	-	-	S29.10016°; E18.63323°	N/A
BH038	-	-	S29.09565°; E18.63349°	N/A
BH0191	-	-	S29.10076°; E18.62511°	N/A
BH0211	-	-	S29.10531°; E18.62675°	N/A
BH034	-	-	S29.11733°; E18.66927°	N/A
BH0241	-	-	S29.12167°; E18.67151°	N/A
BH033	-	-	S29.12501°; E18.67171°	N/A
Oonab-Noord 609				
BH0161	-	-	S29.14523°; E18.51078°	N/A

[Oonab 52 – No drilling]				
N/A	N/A	N/A	N/A	N/A
Amam 46				
BH0151	-	-	S29.14541°; E18.43177°	N/A
BH0181	-	-	S29.14411°; E18.42902°	N/A
BH0171	-	-	S29.14760°; E18.40838°	N/A
BH0141	-	-	S29.15541°; E18.40501°	N/A
BH0131	-	-	S29.15845°; E18.40228°	N/A
BH0121	-	-	S29.16164°; E18.39675°	N/A
Nooisabes 51				
BH0111	-	-	S29.18516°; E18.37902°	Site not assessed – Recommended that development proceed
BH0081	-	-	S29.19210°; E18.36837°	Site not assessed – Recommended that development proceed
BH039	-	-	S29.19651°; E18.39073°	N/A
BH0091	-	-	S29.19867°; E18.39330°	N/A
BH0061	-	-	S29.21853°; E18.37181°	N/A
BH0051	-	-	S29.22112°; E18.36583°	N/A
BH0041	-	-	S29.21996°; E18.36093°	N/A
BH0031	-	-	S29.22201°; E18.36096°	N/A
BH0021	-	-	S29.22100°; E18.35507°	N/A
BH0011	-	-	S29.22130°; E18.35010°	N/A
BH0101	-	-	S29.22585°; E18.34233°	N/A
BH0071	Site KOA-04	MSA & LSA workshop lithic scatter	S29.23079°; E18.35581°	*Drilling impact on identified lithic scatter
*Drilling impact on identified lithic scatter recommended without the developer having to comply with additional heritage compliance requirements				

Table 6: Heritage compliance summary

The SAHRA-APM Unit HIA Comment will state legal requirements for development to proceed, or reasons why, from a heritage perspective, development may not be further considered.

Note:

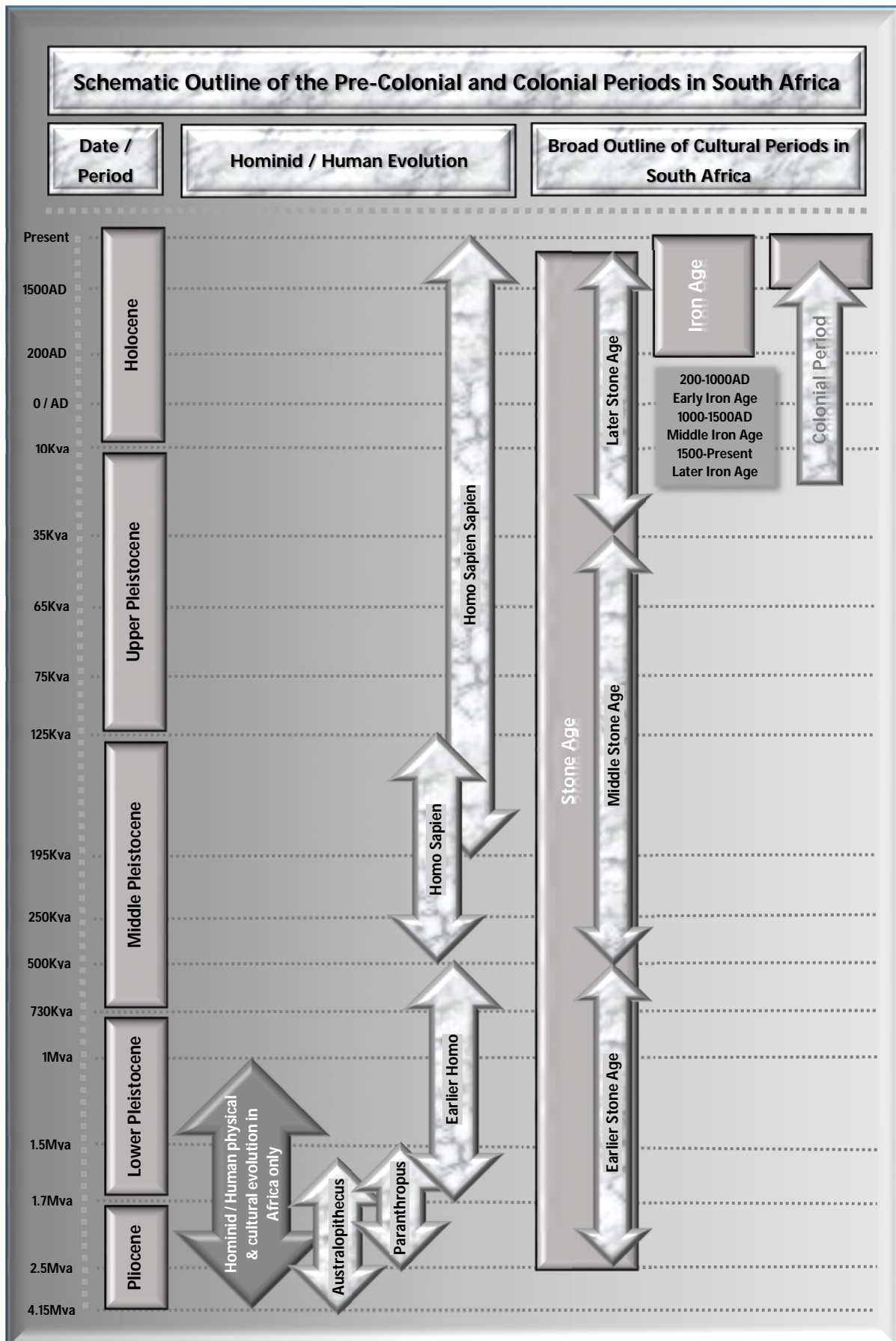
Should any registered Interested & Affected Party (I&AP) wish to be consulted in terms of Section 38(3)(e) of the NHRA 1999 (socio-cultural consultation / SAHRA SIA) it is recommended that the developer / EAP ensures that the consultation be prioritized within the timeframe of the environmental assessment process.

12 – Assumptions, Uncertainties and Gaps in Knowledge

The Koa Valley prospecting is proposed by means of a phased approach, including a desktop study, geological field mapping, semi-regional geophysical ground based survey and invasive techniques, including assaying and drilling. Only the impact of invasive techniques is to be considered with reference to requirements of the NHRA 1999. The impact of assaying, rock chip and soil sample collection, is negligible with reference to the recorded archaeological and cultural heritage of the greater terrain. The Phase 1 AIA focussed on field assessment of the thirty-four (34) identified drill positions. Of the 34 identified drill positions thirty-two (32) were assessed during the Phase 1 AIA field assessment, and excluding drill positions BH0111 and BH0081, Nooisabes 51, due to accessibility constraints. Drill positions BH0111 and BH0081 are both situated in the Koa Valley dune system. It is recommended that development (drilling) proceed at these locales, based on the assumption that the Koa Valley dune system is largely anthropogenically sterile, as has been identified at nine (9) drill positions proposed and assessed, situated in the dune system, including BH0201, BH038, BH0191, and BH0211 (Haramoep 53), BH0161 (Oonab-Noord 609) and BH0171, BH0141, BH0131 and BH0121 (Amam 46).

1. Anthing, L. 1863. *Letter to the Cape Parliament*. Cape Blue Book.
2. Beaumont, P.B., Smith, A.B. & Vogel, J.C. 1995. Before the Eniqua: The Archaeology of the Frontier Zone. In Smith, A.B. (Ed). *Eniqualand: Studies of the Orange River Frontier*. Cape Town: UCT Press.
3. Birkholtz, P. 2016. (PGS). *Spionkop Prospecting Right Project Located on Various Farm Portions near Aggeneys, Nama-Khoi Local Municipality, Namakwa District, Northern Cape Province. Heritage Study: Impact Assessment Report*.
4. De Kock, S. 2012. (Perception Heritage Planning). *Draft Phase 1 Integrated Heritage Impact Assessment Compiled in Terms of Section 38(8) of the National Heritage Resources Act, 1999 (Act 25 of 1999). Proposed Boesmanland Solar Farm (75MW): Portion (300ha) of the Farm Zuurwater 62/6, Namakwaland District, Northern Cape Province*.
5. Dunn, E.J. 1931. *The Bushmen*. London: Charles Griffin & Co.
6. EIMS. 2017. *DMR: Prospecting Work Programme – Submission for a Prospecting Right Application Without Bulk Sampling*.
7. https://en.wikipedia.org/wiki/List_of_heritage_sites_in_Northern_Cape [Accessed: June 2017]
8. Morris, D. 2010. (McGregor). *Cultural Heritage Assessment. Gamsberg – Supplementary Observations to a Previous Specialist Report on Archaeological Resources*.
9. Morris, D. 2011. (McGregor). *Sato Energy Holdings Zuurwater Photovoltaic Energy Generation Facility Development near Aggeneys, Northern Cape. Heritage Impact Assessment*.
10. Morris, D. 2013a. (McGregor). *Archaeological and Cultural Heritage Investigation for the Environmental and Social Impact Assessment (ESIA) for the Gamsberg Zinc Mine and Associated Infrastructure in Northern Cape, South Africa*.
11. Morris, D. 2013b. (McGregor). *Heritage Impact Assessment for the Proposed Photovoltaic Solar Energy Facilities on the Farm Zuurwater, near Aggeneys, Northern Cape Province. (Expanded Survey)*.
12. Morris, D. 2013d. (McGregor). *Heritage Impact Assessment: Proposed Aggeneys Photovoltaic Solar Energy Facility at Bloemhoek near Aggeneys, Northern Cape Province*.
13. Nienaber, G.S. & Raper, P.E. 1977. *Toponymica Hottentotica*. Pretoria: Raad vir Geesteswetenskaplike Navorsing.
14. Orton, J. 2015a. (ASHA). *Final Archaeological Survey for the Proposed Aggeneys Solar Energy Facility, Namakwaland Magisterial District, Northern Cape*.
15. Orton, J. 2015b. (ASHA). *Heritage Scoping Study for Sol Invictus Solar PV Development on Ou Taaibosmond 66/5, Namakwaland Magisterial District, Northern Cape*.
16. Orton, J. 2016. (ASHA). *Heritage Impact Assessment for the Proposed Sol Invictus 1 PV Facility, Namakwaland Magisterial District, Northern Cape*.
17. Orton, J. & Webley, L. 2012 (ACO). *Heritage Impact Assessment for the Proposed Kangnas Wind and Solar Energy facilities, Namakwa Magisterial District, Northern Cape*.
18. SAHRA. 2007. *Minimum Standards: Archaeological and Palaeontological Components of Impact Assessment Reports*.
19. Smith, A. B. 2012. (UCT – Department of Archaeology). *Archaeology Report. Proposed 75MW Solar Facility on Farm 62, Zuurwater, Aggeneys, Northern Cape*.
20. South African Government. (No 107 of) 1998. *National Environmental Management Act*.
21. South African Government. (No 25 of) 1999. *National Heritage Resources Act*.
22. South African Government. (No 28 of) 2002. *Mineral and Petroleum Resources Development Act*.
23. Thompson, G. 1827. *Travels and Adventures in South Africa*. Cape Town: Africana Connoisseurs Press.

24. Volman, T.P. 1984. Early Prehistory of Southern Africa. In Klein, R.G. (Ed). *Southern African Prehistory and Palaeoenvironments*. Netherlands: A.A. Balkema.
25. Webley, L. & Halkett, D. 2012. (ACO). *Heritage Impact Assessment: Proposed Aggeneys Photovoltaic Solar Power Plant on Portion 1 of the Farm Aroams 57, Northern Cape Province*.
26. Webley, L. & Halkett, D. 2017a. (ACO). *Heritage Impact Assessment: Proposed Construction of the Letsoai CSP 1 Solar Facility on the Remaining Extent of the Farm Hartebeest Vlei 86, near Aggeneys, as well as Water Pipeline to the Orange River, Northern Cape*.
27. Webley, L. & Halkett, D. 2017b. (ACO). *Heritage Impact Assessment: Proposed Construction of the Enamandla PV 1 Solar Facility on the Remaining Extent of the Farm Hartebeest Vlei 86, near Aggeneys, Northern Cape*.
28. Webley, L. & Halkett, D. 2017c. (ACO). *Heritage Impact Assessment: Proposed Construction of the Enamandla PV 2 Solar Facility on the Remaining Extent of the Farm Hartebeest Vlei 86, near Aggeneys, Northern Cape*.
29. Webley, L. & Halkett, D. 2017d. (ACO). *Heritage Impact Assessment: Proposed Construction of the Enamandla PV 3 Solar Facility on the Remaining Extent of the Farm Hartebeest Vlei 86, near Aggeneys, Northern Cape*.
30. Webley, L. & Halkett, D. 2017e. (ACO). *Heritage Impact Assessment: Proposed Construction of Letsoai and Enamandla 400kV Powerline and Substation Facilities, near Aggeneys, Northern Cape*.



Acronyms & Abbreviations

AD	: Anno Domini (the year 0)
AIA	: Archaeological Impact Assessment
AMAFA	: Amafa aKwaZulu-Natali (Natal PHRA)
ASAPA	: Association of Southern African Professional Archaeologists
BAR	: Basic Assessment Report
BC	: Before the Birth of Christ (the year 0)
BCE	: Before the Common Era (the year 0)
BID	: Background Information Document
BP	: Before the Present (the year 0)
cm	: Centimetre
CMP	: Conservation Management Plan
CRM	: Cultural Resources Management
DAC	: Department of Arts and Culture
DEAT	: Department of Environmental Affairs and Tourism
DME	: Department of Minerals and Energy
EAP	: Environmental Assessment Practitioner
ECO	: Environmental Control Officer
ELO	: Environmental Liaison Officer
EC PHRA	: Eastern Cape Provincial Heritage Resources Authority
EIA ₁	: Environmental Impact Assessment
EIA ₂	: Early Iron Age
EMPr	: Environmental Management Plan / Programme Report
ESA	: Earlier Stone Age
ha	: Hectare
HIA	: Heritage Impact Assessment
HWC	: heritage Western Cape
ICOMOS	: International Council on Monuments and Sites
IEM	: Integrated Environmental Management
km	: kilometre
Kya	: Thousands of years ago
LIA	: Later Iron Age
LSA	: Later Stone Age
m	: metre
m ²	: Square meter
MIA	: Middle Iron Age
Mm	: millimetre
MPRDA 2002	: Mineral and Petroleum Resources Development Act, No 28 of 2002
MSA	: Middle Stone Age
Mya	: Millions of years ago
NEMA 1998	: National Environmental Management Act, No 107 of 1998
NHRA 1999	: National Heritage Resources Act, No 25 of 1999
PIA	: Palaeontological Impact Assessment
PHRA	: Provincial Heritage Resources Authority
PSSA	: Palaeontological Society of South Africa
PPP	: Public Participation Process
SAHRA	: South African Heritage Resources Agency
SAHRIS	: South African Heritage Resources Information System
SIA	: Social Impact Assessment