

**Lowlands Hydropower and Distribution,
Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock,
Chris Hani District Municipality, Eastern Cape**

- 22 December 2020 -

Report to:

Sello Mokhanya (Eastern Cape Provincial Heritage Resources Agency – EC PHRA, APM Unit)
E-mail: smokhanya@ecphra.org.za; Tel: 043 745 0888; Address: N/A

Chris Bradfield (Isi-Xwiba Consulting)
E-mail: isix@lcom.co.za; Tel: 083 441 1189; Address: Private Bag X7055, Queenstown, 5320



Prepared by:

Karen van Ryneveld (ArchaeoMaps)
E-mail: karen@archaeomaps.co.za; Tel: 084 871 1064; Address: Postnet Suite 239, Private Bag X3, Beacon Bay, 5205

Specialist 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, and with cognisance to environmental legislation, regulations and policies, including the principle of Integrated Environmental Management (IEM).



Signature –

- 22 December 2020 -

**Lowlands Hydropower and Distribution,
Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock,
Chris Hani District Municipality, Eastern Cape**

Executive Summary

Project Description –

Isi-Xwiba Consulting have been appointed as independent EAP by the owner and developer, Lowmar (Pty) Ltd, to apply for the EA, including a BAR and EMP to the Eastern Cape DEDEAT for the *Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, Chris Hani District Municipality, Eastern Cape* development. The proposed development is situated at general development co-ordinate S31°54'20.6"; E25°29'50.9" [1:50,000 Map Ref – 3125CD]. The developer proposes to construct a new section of earth canal (±230m) linking into the existing Knutsford Irrigation Scheme canal at an existing maintenance sluice and return surplus water into the Great Fish River via a 1,900mm diameter pipe / hydro-plant to generate ±306kW power. Construction of the hydro-plant will include excavation of the river embankment, placement of the pipe and hydro-plant, associated with concrete works, back-filling of excavated material and protection of the 'discharge to river' return area and the embankment. An overhead powerline (±5.5km) will be constructed to distribute <275kV to five (5) existing transformer points on the property. Operation will require the opening of two (2) existing sluice gates at the Knutsford Irrigation Scheme canal for a distance of ±1.8km, where the new section of canal will be constructed to lead water to the hydro-plant.

The Phase 1 Archaeological & Cultural Heritage Impact Assessment –

Project Name & Locality: *Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, Chris Hani District Municipality, Eastern Cape* [1:50,000 Map Ref – 3125CD].

Summary of Findings:

Four (4) archaeological and cultural heritage sites or resources (Sites LDS-01 – LDS-04), as defined and protected by the NHRA 1999, were identified during the field assessment. All identified sites comprise Colonial Period sites: Sites LDS-01, LDS-02 and LDS-04 all constitute Colonial Period Built Environment sites, including farmsteads and a residence, all of which are still in use with SAHRA Minimum Standard compliance measures for purposes of permanent site conservation already in place. Site LDS-03 comprise a Colonial Period cemetery. Recommendations for purposes of permanent conservation within the development framework and farm owner custodianship include the cemetery area, situated within an agricultural field, to be fenced with an access gate and sign-posted. Primary conservation measures, including the instalment of a fence and access gate have already been complied with, with only signage of the site outstanding at the time of submission of this report. The continued (Sites LDS-01, LDS-02 and LDS-04) and in the case of Site LDS-03 additional conservation of identified protected heritage resources designates the positive cumulative impact of development from an archaeological and cultural heritage perspective.

The study site is characterized by a low density of surface Stone Age lithics, including Middle (MSA) and Later Stone Age (LSA) artefacts, but with artefact ratios (artefacts: m²) too low to be archaeologically significant.

- The proposed development poses no 'Fatal Flaws' with reference to archaeological and cultural heritage resources.
- From an archaeological and cultural heritage point of view consideration of a 'No Development' option is irrelevant.
- Sites LDS-01, LDS-02 and LDS-04: Existing conservation measures comply with SAHRA Minimum Standards for site conservation, no additional conservation measures for purposes of development, during the construction or operation / use phases are necessary. Site LDS-03: Recommended site conservation measures have largely been complied with (fence and access gate) with only heritage signage of the site still to be done (recommended to be done prior to or during the construction phase for compliance purposes during the operation / use phase).
- The development will have a long-term positive cumulative impact on the identified heritage sites / resources.
- [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 the process described in 'Appendix B: Heritage Protocol for Incidental Finds during the Construction Phase' should be followed. The developer is advised to ensure a sufficient heritage contingency budget to address incidental finds during the course of development.]

Recommendations –

With reference to archaeological and cultural heritage compliance, as per the requirements of the NHRA 1999, it is recommended that the *Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, Chris Hani District Municipality, Eastern Cape* development proceeds as applied for, provided the developer comply with the recommended archaeological and cultural heritage compliance requirements (see Heritage Compliance Summary – piii).

The EC PHRA-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 – Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat River 16, near Cradock, Chris Hani District Municipality, Eastern Cape				
Map Code	Site	Co-ordinates	Site Significance	Recommendations
Lowlands Hydropower and Distribution				
LDS-01	Colonial Period – Farmstead	S31°54'13.4"; E25°28'27.4"	High Significance Local Grade III-B Field Rating	Permanent Conservation - Conservation measures are in place
LDS-02	Colonial Period – Residence	S31°54'20.0"; E25°28'56.9"	High / Medium Significance Generally Protected IV-A Field Rating	Permanent Conservation - Conservation measures are in place
LDS-03	Colonial Period – Cemetery	S31°54'33.8"; E25°30'02.1"	High Significance Local Grade III-A Field Rating	Permanent Conservation - Permanent fence with access gate & heritage signage indicating the site as a 'Heritage Site' [Fence & access gate have been instated, only signage still to be done]
LDS-04	Colonial Period – Farmstead	S31°54'49.2"; E25°30'22.3"	High Significance Local Grade III-B Field Rating	Permanent Conservation - Conservation measures are in place
A low density of MSA & LSA surface artefacts characterize the study site. Artefact ratios (artefacts: m ²) are however too low to designate the observation as a 'site' or 'occurrence'.				
N/A	Hydro-plant	S31°54'05.9"; E25°29'04.3"	N/A	N/A
N/A	Weir Crest	S31°54'11.9"; E25°28'52.6"	N/A	N/A
N/A	Weir Head	S31°54'12.4"; E25°28'53.9"	N/A	N/A
N/A	Bridge Structure	S31°54'11.7"; E25°28'55.5"	N/A	N/A
N/A	Measuring Structure	S31°54'11.0"; E25°28'56.5"	N/A	N/A
N/A	Inlet	S31°54'29.4"; E25°30'02.4"	N/A	N/A
N/A	Outlet Option 1 (Preferred site)	S31°53'55.4"; E25°29'39.0"	N/A	N/A
N/A	Outlet Option 2	S31°54'22.3"; E25°29'51.6"	N/A	N/A
N/A	Outlet Option 3	S31°54'30.2"; E25°30'00.9"	N/A	N/A
N/A	Powerline (Start)	S31°54'13.5"; E25°28'23.8"	N/A	N/A
N/A	Powerline (End)	S31°54'23.5"; E25°29'57.9"	N/A	N/A

CONTENTS

1 – Project Description & Terms of Reference	1
2 – The Phase 1 Archaeological & Cultural Heritage Impact Assessment	4
2.1) Archaeological & Cultural Heritage Legislative Compliance	4
2.2) Methodology & Gap Analysis	4
2.1 – Pre-feasibility Assessment	6
2.1.1) Pre-feasibility Summary	6
2.1.2) The SAHRA 2009 MPD & SAHRIS	6
2.1.3) SAHRA Provincial Heritage Site Database – Eastern Cape	6
2.1.4) General Discussion	7
2.2 – Field Assessment	8
2.2.1) Site LDS-01 – Colonial Period – Farmstead: S31°54'13.4"; E25°28'27.4"	8
2.2.2) Site LDS-02 – Colonial Period – Residence: S31°54'20.0"; E25°28'56.9"	8
2.2.3) Site LDS-03 – Colonial Period – Cemetery: S31°54'33.8"; E25°30'02.1"	9
2.2.4) Site LDS-04 – Colonial Period – Farmstead: S31°54'49.2"; E25°30'22.3"	9
3 – Environmental Impact Assessment Rating	21
4 – Recommendations	23
5 – Acronyms & Abbreviations	25
6 – References	26

Appendix A:

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

Appendix B:

Heritage Protocol for Incidental Finds during the Construction Phase

Appendix C:

Resumé: Karen van Ryneveld

List of Figures

Figure 1: Chief Surveyor General diagram (CGS Record: 7739/1980) of the Farm Portion 15 (Lowlands) of the Farm Kat Kop 16, Cradock, 1980	10
---	----

List of Maps

Map 1: General locality of the Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, CHDM, Eastern Cape – 02 (Base Map – MapStudio, 2008)	1
Map 2: General locality of the Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, CHDM, Eastern Cape – 02 [1:50,000 Map Ref – 3125CD]	2
Map 3: General locality of the Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, CHDM, Eastern Cape – 03	3
Map 4: General locality of the Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, CHDM, Eastern Cape – 04	3
Map 5: Spatial distribution of geo-referenced PHSs in the SAHRA – Eastern Cape database in relation to the Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, CHDM, Eastern Cape study site (https://en.wikipedia.org/wiki/List_of_heritage_sites_in_Eastern_Cape)	7
Map 6: Phase 1 AIA field assessment results for the <i>Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, CHDM, Eastern Cape</i> study site	20

List of Plates

Plate 1: General view of Site LDS-01 [1]	11
Plate 2: General view of Site LDS-01 [2]	11
Plate 3: General view of Site LDS-01 [3]	11
Plate 4: General view of Site LDS-01 [4]	11
Plate 5: General view of Site LDS-02 [1]	12
Plate 6: General view of Site LDS-02 [2]	12
Plate 7: General view of Site LDS-03	12
Plate 8: Close-up of graves at Site LDS-03 [1]	12
Plate 9: Close-up of graves at Site LDS-03 [2]	13
Plate 10: Close-up of graves at Site LDS-03 [3]	13
Plate 11: Close-up of graves at Site LDS-03 [4]	13
Plate 12: Close-up of graves at Site LDS-03 [5]	13
Plate 13: Instated conservation fence at Site LDS-03 (courtesy Lowlands) [1]	14
Plate 14: Instated conservation fence at Site LDS-03 (courtesy Lowlands) [2]	14
Plate 15: General view of Site LDS-04 [1]	14
Plate 16: General view of Site LDS-04 [2]	14
Plate 17: General view of the powerline route [1]	15
Plate 18: General view of the powerline route [2]	15
Plate 19: General view of the powerline route [3]	15
Plate 20: General view of the powerline route [4]	15
Plate 21: View of the Knutsford Irrigation Scheme weir	16
Plate 22: View of the bridge across the Great Fish River at the weir	16
Plate 23: View across the canal near the weir with the measuring structure in the background	16
Plate 24: General view of the canal [1]	16
Plate 25: General view of the canal [2]	17
Plate 26: General view of the canal [3]	17
Plate 27: Anthropogenic sterile canal sections	17
Plate 28: General view of the hydro-plant study site	17
Plate 29: General view of the existing inlet	18
Plate 30: General view of the outlet Option 1 (Preferred Option) study site [1]	18
Plate 31: General view of the outlet Option 1 (Preferred Option) study site [2]	18
Plate 32: View of the agricultural field through which the line route will run for development of the at the outlet Option 1 (Preferred Option) study site	18
Plate 33: General view of the outlet Option 2 study site [1]	19
Plate 34: General view of the outlet Option 2 study site [1]	19
Plate 35: General view of the outlet Option 3 study site	19
Plate 36: Low density of Stone Age artefacts present at the site	19

List of Tables

Table 1: Extract from the NHRA 1999, Section 38	4
Table 2: SAHRA archaeological and cultural heritage site significance assessment ratings and associated mitigation recommendations	5
Table 3: Archaeological and basic cultural heritage probability assessment	6
Table 4: Environmental Impact Assessment Rating: <i>Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, CHDM, Eastern Cape</i>	22
Table 5: Heritage compliance summary	24
Table 6: List of Acronyms and Abbreviations	25

1 – Project Description & Terms of Reference

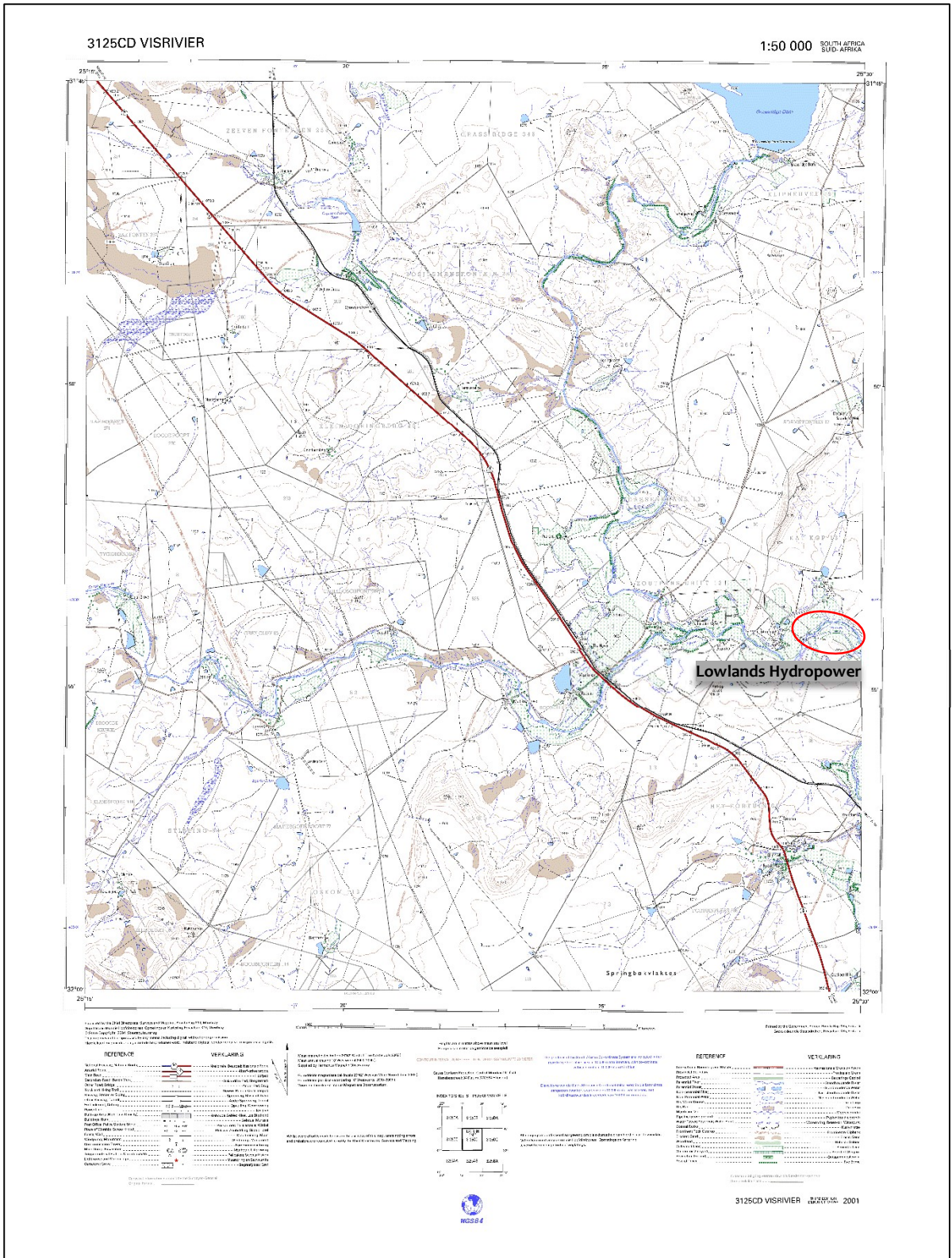
Isi-Xwiba Consulting have been appointed as independent Environmental Assessment Practitioner (EAP) by the owner and developer, Lowmar (Pty) Ltd, to apply for the Environmental Authorization (EA), including a Basic Assessment Report (BAR) and Environmental Management Plan (EMPr) to the Eastern Cape Department of Economic Development, Environmental Affairs and Tourism (DEDEAT) for the *Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, Chris Hani District Municipality, Eastern Cape* development. The proposed development is situated at general development co-ordinate S31°54'20.6"; E25°29'50.9" [1:50,000 Map Ref – 3125CD]. The developer proposes to construct a new section of earth canal ($\pm 230\text{m}$) linking into the existing Knutsford Irrigation Scheme canal at an existing maintenance sluice and return surplus water into the Great Fish River via a 1,900mm diameter pipe / hydro-plant to generate $\pm 306\text{kW}$ power. Construction of the hydro-plant will include excavation of the river embankment, placement of the pipe and hydro-plant, associated with concrete works, back-filling of excavated material and protection of the 'discharge to river' return area and the embankment. An overhead powerline ($\pm 5.5\text{km}$) will be constructed to distribute $< 275\text{kV}$ to five (5) existing transformer points on the property. Operation will require the opening of two (2) existing sluice gates at the Knutsford Irrigation Scheme canal for a distance of $\pm 1.8\text{km}$, where the new section of canal will be constructed to lead water to the hydro-plant (Isi-Xwiba 2020).

ArchaeoMaps have been appointed by Isi-Xwiba Consulting to compile the Phase 1 Archaeological & Cultural Heritage Impact Assessment (AIA) for the development, as specialist component to the application's Heritage Impact Assessment (HIA), and with findings and recommendations thereof to be included in the BAR and EMPr. Terms of Reference (ToR) for the Phase 1 AIA are summarized as:

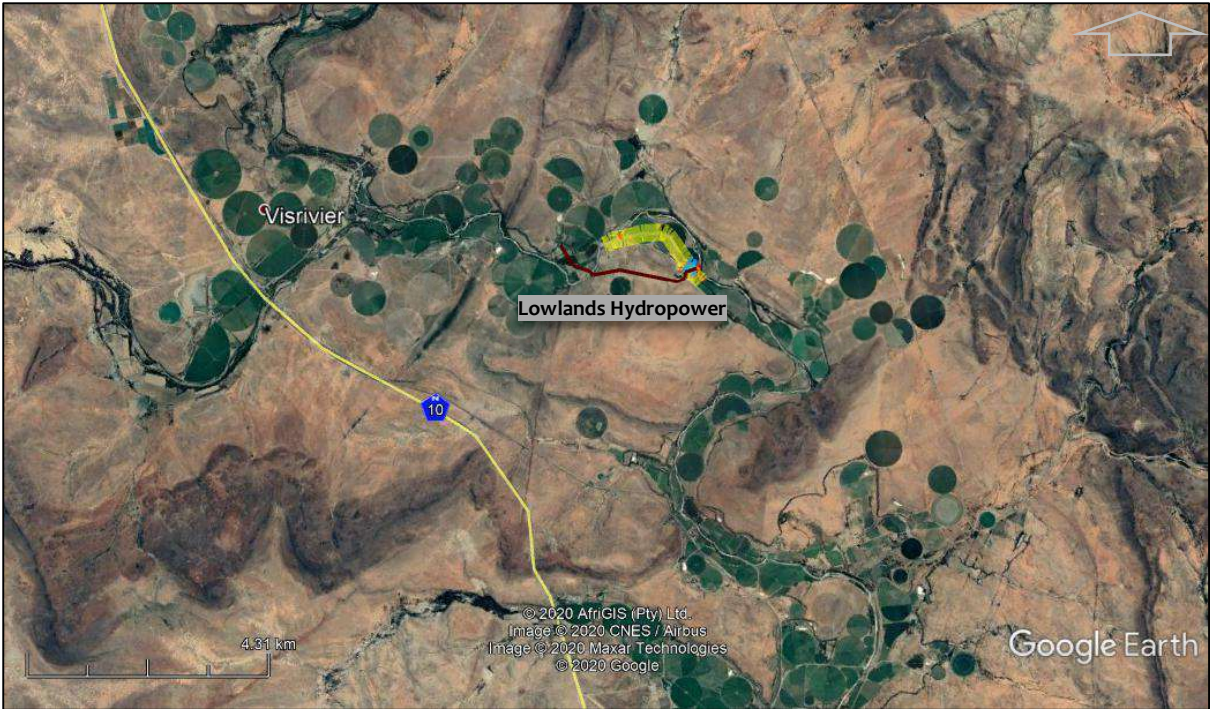
- Describe the existing area to be directly affected by the proposal in terms of its archaeological and cultural heritage characteristics as formally protected by the National Heritage Resources Act, No 25 of 1999 (NHRA 1999) and the general sensitivity of these components to change;
- Describe the likely scope, scale and significance of impacts (positive and negative) on the archaeological and cultural heritage resources of the area associated with the 1) construction 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 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 Development' option;
- Broadly comment on the cumulative impact (positive or negative) on archaeological or cultural heritage resources associated with the 1) construction 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.



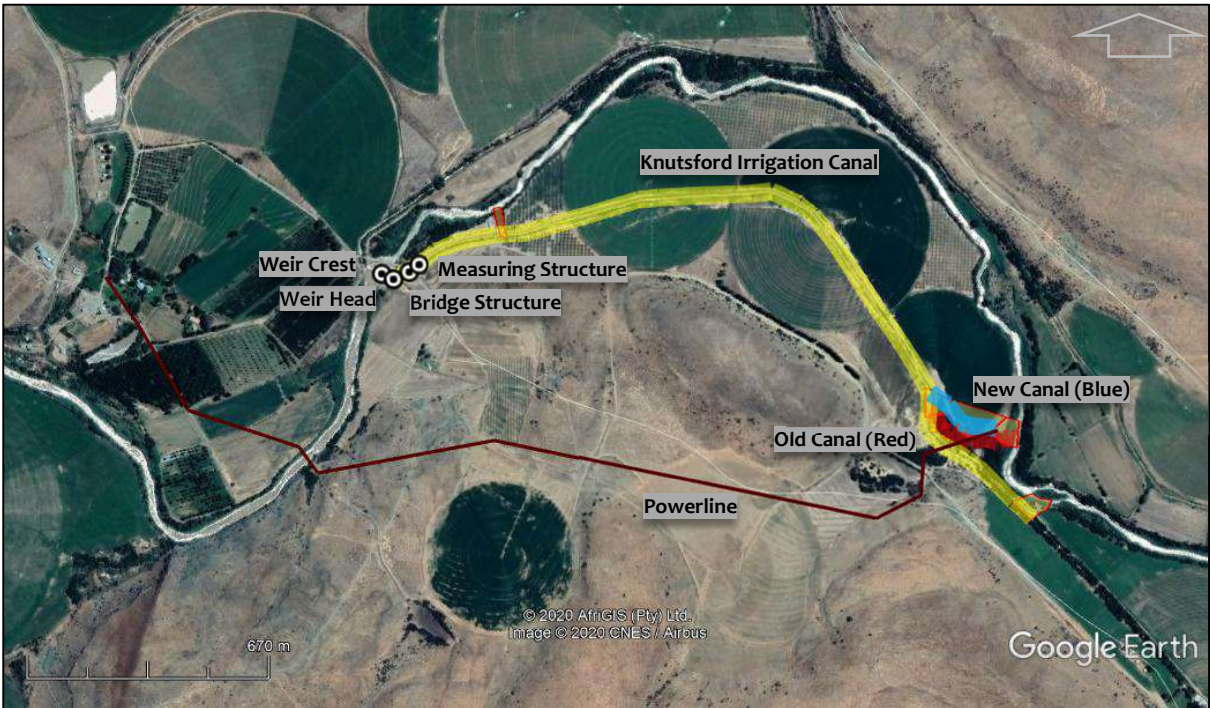
Map 1: General locality of the *Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, CHDM, Eastern Cape* – 02 (Base Map – MapStudio, 2008)



Map 2: General locality of the Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, CHDM, Eastern Cape – 02 [1:50,000 Map Ref – 3125CD]



Map 3: General locality of the Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, CHDM, Eastern Cape – 03



Map 4: General locality of the Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, CHDM, Eastern Cape – 04

2 – The Phase 1 Archaeological & Cultural Heritage Impact Assessment

2.1) Archaeological & Cultural Heritage Legislative Compliance

The Phase 1 Archaeological & Cultural Heritage Impact Assessment (AIA) for the *Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, Chris Hani District Municipality, Eastern Cape*, was requested to meet the Eastern Cape Provincial Heritage Resources Authority's (EC PHRA) 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)(a) and 38(1)(c)(i). 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 the EC PHRA.

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 5,000m² 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 (2017).

2.2) Methodology & Gap Analysis

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 1 day period (18 November 2020) 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 680 (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 Heritage Impact Assessment (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

2.1.1) Pre-feasibility Summary

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 affected by, or situated in proximity to the *Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, Chris Hani District Municipality, Eastern Cape* study site can briefly be described as:

Archaeological and Basic Cultural Heritage Probability Assessment – Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat River 16, near Cradock, Chris Hani District Municipality, Eastern 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)		Medium
	Middle Stone Age (MSA)		Medium-High
	Later Stone Age (LSA)		Medium
		Rock Art	Medium
		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		High
		LSA – Colonial Period Contact	Low
		LIA – Colonial Period Contact	None-Low
		Industrial Revolution	None
		Apartheid & Struggle	None-Low
	Graves / human remains: Medium-high scientific & high social significance		

Table 3: Archaeological and basic cultural heritage probability assessment

2.1.2) The SAHRA 2009 MPD & SAHRIS

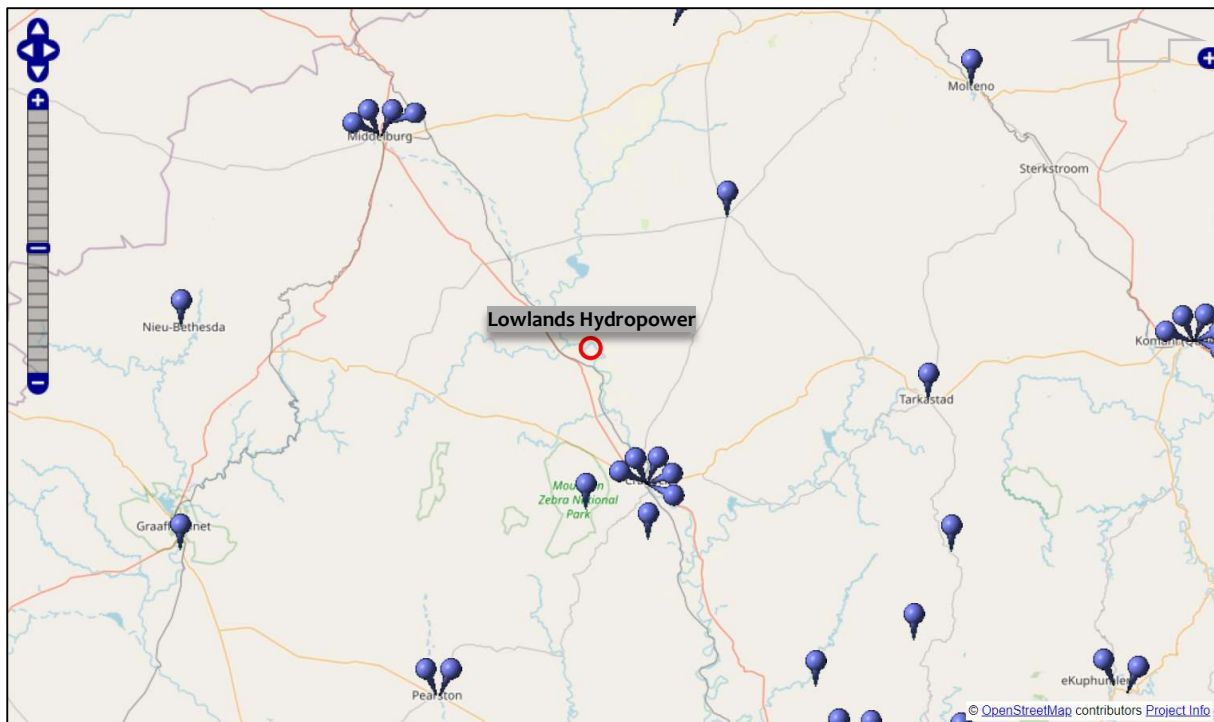
Seven (7) SAHRIS cases are recorded within an approximate 20km radius from the *Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, Chris Hani District Municipality, Eastern Cape* study site. Of the recorded SAHRIS cases two (2) are mining permit applications, recorded as ‘For Noting’ only, with no associated heritage reports (SAHRIS CaseID: 1914 and 2597). Five (5) of the recorded SAHRIS cases are associated with heritage reports, with the relevant Archaeological and Cultural Heritage (AIA) components of these studies referenced as:

- Booth, C. (Albany Museum). 2012a. A Phase 1 Archaeological Impact Assessment for the Proposed Establishment of the Rodicon Solar Energy Facility on the Farm Zakfontein 267, between Middleburg and Cradock, Eastern Cape Province (SAHRIS CaseID: 263);
- Booth, C. (Albany Museum). 2012b. A Phase 1 Archaeological Impact Assessment: Upgrade of N10 Section 3 from the Riet River (km45.2) to Tarka Bridge (km68.5), Eastern Cape Province (SAHRIS CaseID: 2157);
- Nel, J. & De Kamper, G. (Archaic HPM). 2008. Final Report – Heritage Resources Scoping Survey and Preliminary Assessment. Transnet Freight Line EIA, Eastern Cape and Northern Cape (SAHRIS CaseID: 749 and 1355); and
- Van Ryneveld, K. (ArcheoMaps). 2012. Phase 1 Archaeological Impact Assessment – Upgrade of the N10-4 Cradock [km1.6] to Knutsford [km29], Eastern Cape, South Africa (SAHRIS CaseID: 221).

2.1.3) SAHRA Provincial Heritage Site Database – Eastern Cape

No geo-referenced declared Provincial Heritage Sites (PHS) are recorded in the SAHRA – Eastern Cape database (https://en.wikipedia.org/wiki/List_of_heritage_sites_in_Eastern_Cape) and situated within a 10km radius from the *Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, Chris Hani District Municipality, Eastern Cape* study site, with the nearest PHS being situated in Cradock, approximately 33km

from the study site and with further PHSs recorded in the Mountain Zebra National Park, Tarkastad, Hofmeyer and Middleburg, all in excess of 35km and up to 60km from the study site.



Map 5: Spatial distribution of geo-referenced PHSs in the SAHRA – Eastern Cape database in relation to the *Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, CHDM, Eastern Cape* study site (https://en.wikipedia.org/wiki/List_of_heritage_sites_in_Eastern_Cape)

2.1.4) General Discussion

Despite the limited number of systematic archaeological surveys, with results reported on in associated heritage reports, the greater Lowlands terrain seem rich in archaeological resources, albeit poorly known, with heritage resources identified during all of the surveys.

During the Transnet Freight Line survey Earlier (ESA), Middle (MSA) and Later (LSA) Stone Age sites and occurrences were identified, and including LSA rock art engraving sites (Nel & De Kamper 2008). Booth (2012a) described the Rodicon Solar Energy site as typified by MSA stone artefact scatters that extended across the surface of the study site, while a few isolated Stone Age lithics were identified along the N10 Section 3 road alignment (Booth 2012b) and an additional MSA site, as well as a MSA and LSA site were recorded during the N10 Section 4 assessment (Van Ryneveld 2012).

No Iron Age sites have to date been identified in the vicinity of the Lowlands study site, including Earlier (EIA), Middle (MIA) or Later Iron Age (LIA) sites with the study site falling outside the known geographic distribution area of the MIA.

Recorded Colonial Period resources are fairly ample, with a number of such sites reported on during the Transnet Freight Line survey and including farmsteads and structure remains as well as grave sites (Nel & De Kamper 2008). An additional five (5) Colonial Period farmsteads, an old farm gate and two (2) stone walled sites were reported on during the N10 Section 4 assessment (Van Ryneveld 2012), while a Colonial Period road marker was recorded during the N10 Section 3 assessment (Booth 2012b).

Cradock, the nearest town to the Lowlands study site, situated approximately 33km south of Lowlands, was founded in 1812 after the Cape government purchased the farm Buffel's Kloof from Piet van Heerden. The town was officially proclaimed two (2) years later, on January 12th, 1814 (en.wikipedia.org/wiki/Cradock,_Eastern_Cape).

Four (4) archaeological and cultural heritage sites or resources (Sites LDS-01 – LDS-04), as defined and protected by the National Heritage Resources Act, No 25 of 1999 (NHRA 1999), were identified during the field assessment of the *Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, Chris Hani District Municipality, Eastern Cape*. All identified sites comprise Colonial Period sites, all of which will be conserved within the development framework: The Sites LDS-01 and LDS-04 Colonial Period farmsteads are both still in use and well conserved with formal conservation measures in place, while the Site LDS-02 Colonial Period residence is also still in use and similarly fairly well conserved. Formal conservation measures recommended for the Site LDS-03 Colonial Period cemetery, situated in an agricultural field, have been instated to ensure permanent heritage compliant conservation of the site.

The general Lowlands study site is characterized by a low density of Stone Age artefacts. No Earlier Stone Age (ESA) artefacts were observed, with samples present being assigned typologically to the latter part of the Middle Stone Age (MSA) and macrolithic Later Stone Age (LSA), based both on artefact size and the flake and blade technology used in the production thereof. Artefacts were however present in such low quantities that any attempt to ascribe an artefact ratio (artefacts:m²) proved futile, and where present artefact ratios of $\leq 1:100$ were recorded. The observed low presence of lithics is significant in as far they are indicative of possible more significant deposits only.

Aside from Site LDS-01, no archaeological or cultural heritage resources as defined and protected by the NHRA 1999 were identified along the powerline route, with cognisance to the mentioned infrequent presence of lithic artefacts. Site LDS-01 will be conserved and development will not impact on the site.

No archaeological or cultural heritage resources as defined and protected by the NHRA 1999 were identified at the locales of the weir crest and head or bridge and measuring structure or at the proposed hydropower site. Three (3) options for the outlet were assessed, with significant rehabilitation stonework at Option 2, but with the work dating to post-1974 flooding reparation work, thus being younger than 60 years of age and not formally protected by the NHRA 1999.

2.2.1) Site LDS-01 – Colonial Period – Farmstead: S31°54'13.4"; E25°28'27.4"

Site LDS-01 represents the primary Lowlands farmstead, with the main and second residence renovated and currently used as tourist accommodation. Alterations are evident at both buildings, with these in themselves of historic value, being older than 60 years of age. A number of additional structures and outbuildings are situated within the Site LDS-01 Colonial Period farmstead footprint, many of which are time period structures, though others are of more recent origin. The original date of the farmstead is unknown, but may well date to the early 1800s, implying formal protection under the NHRA 1999. The site is well maintained and continued use is inferred to ensure continued maintenance thereof. The powerline route will traverse the southern extremity of the Site LDS-01 footprint, connecting to a transformer within the footprint of the site, but not negatively impacting on any of the structures. The site is at present fenced (partly walled), with an access gate.

- **Site Significance and Recommendations:** Site LDS-01 is ascribed a SAHRA *High Significance* and a *Local Grade III-B Field Rating*. Despite the powerline route crossing into the site footprint (for purposes of connection to an existing transformer), the site will not be negatively impacted by development. The site is at present fenced with an access gate; current conservation measures thus comply with SAHRA Minimum Standards for site conservation. No additional conservation measures are necessary for purposes of the development, not during the construction or operation / use phases of development.

2.2.2) Site LDS-02 – Colonial Period – Residence: S31°54'20.0"; E25°28'56.9"

Site LDS-02 constitutes a Colonial Period workers residence (farmhouse), most probably dating to the early 1800s, thus older than 60 years of age and formally protected by the NHRA 1999. The site is still in use, with current maintenance thereof described as fair. The site is situated approximately 0.2km from the proposed powerline route, and at rough

equal distance from the nearest proposed works along the canal; development will not negatively impact on the site. The site is fenced with an access gate.

- **Site Significance and Recommendations:** Site LDS-02 is ascribed a SAHRA *High-Medium Significance* and a *Generally Protected Grade IV-A Field rating*. The site is situated roughly 0.2km from any proposed works and will not be negatively impacted by the proposed development. The site, still in use, is at present fenced with an access gate; current conservation measures comply with SAHRA Minimum Standards for site conservation. No additional conservation measures are required on behalf of the developer for purposes of development, not during the construction or operation / use phases thereof.

2.2.3) Site LDS-03 – Colonial Period – Cemetery: S31°54'33.8"; E25°30'02.1"

Site LDS-03 comprises a Colonial Period cemetery situated in an agricultural field. The cemetery contains approximately 25+ graves, including adult and children's graves. Where grave markers are identifiable the graves are typified by stone headstones, stone head and footstones and stone outlines, but with grave markers not clearly visible, and in places collapsed, partly buried and generally reminiscent of weathering over significant time, not excluding possible animal burrowing impact on at least some of the graves. Graves were identified across a rough 70x30m area, with the general locality (and including inferred graves localities) partly identifiable by discoloration in vegetation. The cemetery may well predate existing Colonial Period farming infrastructure, and an inference that the graves may relate to earlier trekboers or a very early farming family / party / worker's cemetery cannot be excluded. The current farm owner was unaware of the presence of graves in the field. The site is situated approximately 50m from the nearest point of development impact along the canal; the cemetery is thus not directly threatened by development.

- **Site Significance and Recommendations:** LDS-03 is ascribed a SAHRA *High Significance* with a *Local Grade III-A Field Rating*. The cemetery site will not be impacted by the proposed Lowlands development. However, the site is situated in an agricultural field and recommendations including that the site be fenced with an access gate and sign-posted as a 'Heritage Site' is necessary to ensure the formal conservation thereof in accordance with the SAHRA Minimum Standards for site conservation.

Recommended site conservation measures have been communicated with the farm owner. At the time of submission of this report the site has been fenced with an access gate and all irrigation pipes and standpipes have been removed, with the only recommended conservation measures outstanding being sign-posting of the heritage resource. Recommended conservation measures for purposes of the construction and operation / use phases of the development as well as the farm owner's responsibility as custodian to heritage resources on his property in accordance with the principles of the NHRA 1999 have largely been met, save the addition of the heritage signage.

2.2.4) Site LDS-04 – Colonial Period – Farmstead: S31°54'49.2"; E25°30'22.3"

Site LDS-04 comprises a Colonial Period farmstead and currently serves as the main farmstead, including a main and second residence, related outbuildings and infrastructure. The site is inferred to date to the earlier to mid 1800s; being well older than 60 years of age, the site is formally protected by the NHRA 1999. The site, as mentioned, is still in use and notably well maintained. Existing conservation measures include a fence and access gates. The site is situated approximately 800m from the nearest point of development along the canal and will not be impacted by development.

- **Site Significance and Recommendations:** Site LDS-04 is ascribed a SAHRA *High Significance* with a *Local Grade III-B Field Rating*. The site will not be impacted by development, based on proximity therefrom and is still in use and well maintained. Current conservation measures, including a permanent fence and access gate, complies with SAHRA Minimum Standards for site conservation: No additional conservation measures are necessary for purposes of development, not during the construction or operation / use phases of development.

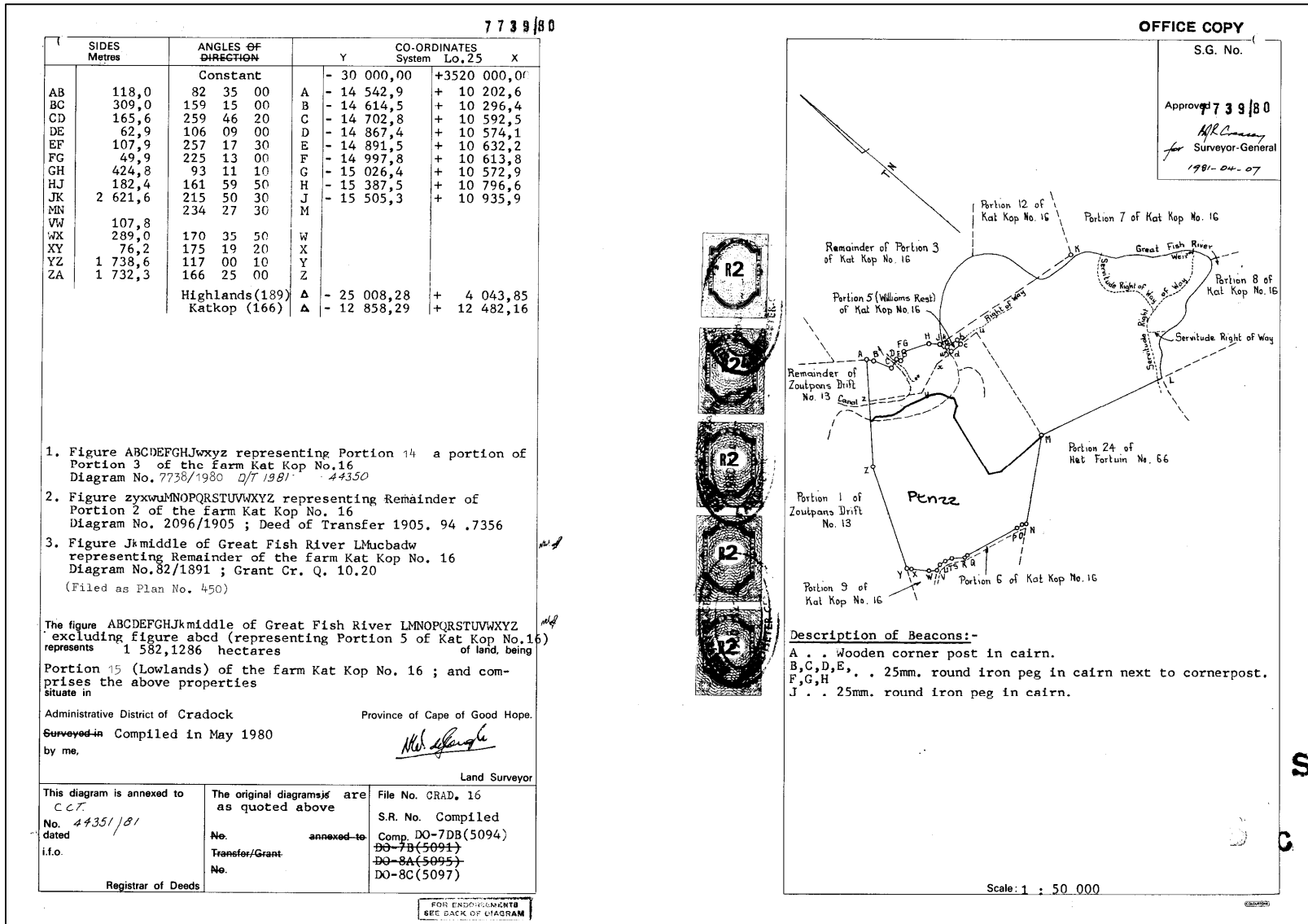


Figure 1: Chief Surveyor General diagram (CGS Record: 7739/1980) of the Farm Portion 15 (Lowlands) of the Farm Kat Kop 16, Cradock, 1980



Plate 1: General view of Site LDS-01 [1]



Plate 3: General view of Site LDS-01 [3]



Plate 2: General view of Site LDS-01 [2]



Plate 4: General view of Site LDS-01 [4]



Plate 5: General view of Site LDS-02 [1]



Plate 7: General view of Site LDS-03



Plate 6: General view of Site LDS-02 [2]



Plate 8: Close-up of graves at Site LDS-03 [1]



Plate 9: Close-up of graves at Site LDS-03 [2]



Plate 11: Close-up of graves at Site LDS-03 [4]



Plate 10: Close-up of graves at Site LDS-03 [3]



Plate 12: Close-up of graves at Site LDS-03 [5]

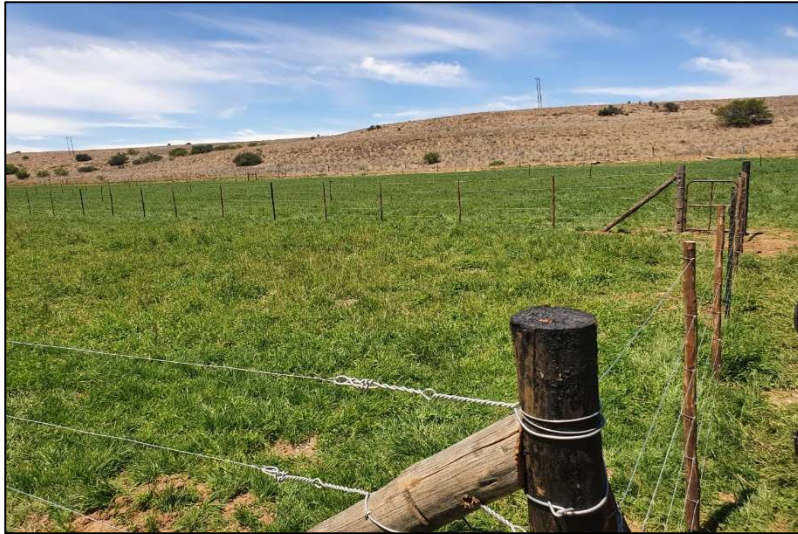


Plate 13: Instated conservation fence at Site LDS-03 (courtesy Lowlands) [1]



Plate 15: General view of Site LDS-04 [1]



Plate 14: Instated conservation fence at Site LDS-03 (courtesy Lowlands) [2]



Plate 16: General view of Site LDS-04 [2]



Plate 17: General view of the powerline route [1]



Plate 19: General view of the powerline route [3]



Plate 18: General view of the powerline route [2]



Plate 20: General view of the powerline route [4]



Plate 21: View of the Knutsford Irrigation Scheme weir



Plate 23: View across the canal near the weir with the measuring structure in the background



Plate 22: View of the bridge across the Great Fish River at the weir



Plate 24: General view of the canal [1]



Plate 25: General view of the canal [2]



Plate 27: Anthropogenic sterile canal sections



Plate 26: General view of the canal [3]



Plate 28: General view of the hydro-plant study site



Plate 29: General view of the existing inlet



Plate 31: General view of the outlet Option 1 (Preferred Option) study site [2]



Plate 30: General view of the outlet Option 1 (Preferred Option) study site [1]



Plate 32: View of the agricultural field through which the line route will run for development of the outlet Option 1 (Preferred Option) study site



Plate 33: General view of the outlet Option 2 study site [1]



Plate 35: General view of the outlet Option 3 study site



Plate 34: General view of the outlet Option 2 study site [1]



Plate 36: Low density of Stone Age artefacts present at the site



Map 6: Phase 1 AIA field assessment results for the Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, CHDM, Eastern Cape study site

3 – Environmental Impact Assessment Rating

Identified archaeological and cultural heritage resources are ascribed an Environmental Impact Assessment (EIA) rating, based on the outline presented below to provide a significance rating of development impact on resources, both during the 1) construction and 2) operation and use phases of development (in accordance with NEMA 1998, Regulations 2014):

Overall Nature:	1) Negative (negative impact on affected biophysical or human environment), or 2) Positive (benefit to the affected biophysical or human environment).
Type:	1) Direct (caused by the action and occur at the same time and place), 2) Indirect or secondary (caused by the action and are later in time or further removed in distance but reasonably foreseeable), or 3) Cumulative (impact which results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions; can result from individually minor, but collectively significant actions taking place over a period of time).
Spatial Extent:	1) Site (immediate area of activity, incorporating a 5m zone from the edge of the affected area), 2) Local (area up to and/or within 10km from the 'site' as defined above), 3) Regional (entire community, basin or landscape), or 4) National (South Africa).
Duration:	1) Short-term (impact would last for the duration of activities; quickly reversible), 2) Medium-term (impact would affect project activity; reversible over time), 3) Long-term (impact would continue beyond project activity), or 4) Permanent (impact would continue beyond decommissioning).
Severity:	1) Low , 2) Medium , or 3) High , being +) Positive , or -) Negative (based on separately described categories examining whether the impact is destructive or benign, whether it destroys the impacted environment, alters its functionality or slightly alters the environment itself).
Reversibility:	1) Completely reversible (completely reversible impact with implementation of correct mitigation measures), 2) Partly reversible (partly reversible impact with implementation of correct mitigation measures), or 3) Irreversible (impact cannot be reversed, regardless of mitigation or rehabilitation measures).
Replaceability:	1) Resource will not be lost (resource will not be lost provided mitigation measures are implemented), 2) Resource will be partly lost (partial loss or destruction of the resource will occur even though management and mitigation measures are implemented), or 3) Resource cannot be replaced (resource is irreplaceable no matter which management or mitigation measures are implemented).
Probability:	1) Unlikely (<40% probability), 2) Possible (40% probability), 3) Probable (>70% probability), or 4) Definite (>90% probability).
Mitigation potential:	1) High or completely mitigatable (relatively easy and cost effective to manage. Specialist expertise and equipment generally not required. Nature of impact easily understood and may be mitigated through implementation of a management plan or 'good housekeeping', including regular monitoring and reporting regimes. Significance of the impact after mitigation is likely to be low or negligible), 2) Moderate or partially mitigatable (management requires higher level of expertise and resources to maintain impacts with acceptable levels. Mitigation can be tied up in the design of the project. Significance of the impacts after mitigation is likely to be low to moderate. It may not be possible to mitigate the impact entirely, with residual impacts resulting), or 3) Low or un-mitigatable (will not be possible to mitigate the impact entirely, regardless of expertise and resources. Potential to manage the impacts may be beyond the scope of the project. Management of the impact is not likely to result in a measurable change in the level of significance).
Impact significance:	1) Negligible , 2) Low (largely of HIGH mitigation potential, after consideration of other criteria), 3) Moderate (largely of MODERATE or partial mitigation potential, after consideration of other criteria), or 4) Substantial (largely of LOW mitigation potential, after consideration of other criteria).

Environmental Impact Assessment Rating – Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat River 16, near Cradock, Chris Hani District Municipality, Eastern Cape												
Potential Impacts	Overall nature	Type	Spatial extent	Duration	Severity	Reversibility	Replaceability	Probability	MITIGATION POTENTIAL	IMPACT SIGNIFICANCE		MITIGATION MEASURES
										Without mitigation	With mitigation	
SITES: LDS-01												
Construction phase	Positive	Cumulative	Local	Permanent	High (+)	Irreversible	Resource will not be lost	Definite	N/A	N/A	N/A	Permanent Conservation
Operational phase	Positive	Cumulative	Local	Permanent	High (+)	N/A	N/A	Definite	N/A	N/A	N/A	Permanent Conservation
SITES: LDS-02												
Construction phase	Positive	Cumulative	Local	Permanent	High (+)	Irreversible	Resource will not be lost	Definite	N/A	N/A	N/A	Permanent Conservation
Operational phase	Positive	Cumulative	Local	Permanent	High (+)	N/A	N/A	Definite	N/A	Substantial	Substantial	Permanent Conservation
SITES: LDS-03												
Construction phase	Negative	Direct	Site	Short term	Medium (-)	Partly reversible	Resource will be lost	Possible	High or Completely mitigatable	Low	Substantial	Permanent Conservation
Operational phase	Positive	Cumulative	Local	Permanent	High (+)	N/A	N/A	Definite	N/A	N/A	N/A	Permanent Conservation
SITES: LDS-04												
Construction phase	Positive	Cumulative	Local	Permanent	High (+)	Irreversible	Resource will not be lost	Definite	N/A	N/A	N/A	Permanent Conservation
Operational phase	Positive	Cumulative	Local	Permanent	High (+)	N/A	N/A	Definite	N/A	N/A	N/A	Permanent Conservation
Mitigation details: Site LDS-01: Permanent Conservation – Conservation measures are in place; Site LDS-02: Permanent Conservation – Conservation measures are in place; Site LDS-03: Permanent Conservation – Permanent fence with access gate & heritage signage indicating the site as a ‘Heritage Site’ [Fence & access gate have been instated, only signage still to be done]; and Site LDS-04: Permanent Conservation – Conservation measures are in place.												

Table 4: Environmental Impact Assessment Rating: Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, CHDM, Eastern Cape

With reference to archaeological and cultural heritage compliance, as per the requirements of the NHRA 1999, it is recommended that the *Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, Chris Hani District Municipality, Eastern Cape* development proceeds as applied for, provided the developer comply with the recommended archaeological and cultural heritage compliance requirements.

Four (4) archaeological and cultural heritage sites or resources (Sites LDS-01 – LDS-04), as defined and protected by the NHRA 1999, were identified during the field assessment. All identified sites comprise Colonial Period sites: Sites LDS-01, LDS-02 and LDS-04 all constitute Colonial Period Built Environment sites, including farmsteads and a residence, all of which are still in use with SAHRA Minimum Standard compliance measures for purposes of permanent site conservation already in place. Site LDS-03 comprise a Colonial Period cemetery. Recommendations for purposes of permanent conservation within the development framework and farm owner custodianship include the cemetery area, situated within an agricultural field, to be fenced with an access gate and sign-posted. Primary conservation measures, including the instalment of a fence and access gate have already been complied with, with only signage of the site outstanding at the time of submission of this report. The continued (Sites LDS-01, LDS-02 and LDS-04) and in the case of Site LDS-03 additional conservation of identified protected heritage resources designates the positive cumulative impact of development from an archaeological and cultural heritage perspective.

The study site is characterized by a low density of surface Stone Age lithics, including Middle (MSA) and Later Stone Age (LSA) artefacts, but with artefact ratios (artefacts: m²) too low to be archaeologically significant.

- The proposed development poses no ‘Fatal Flaws’ with reference to archaeological and cultural heritage resources.
- From an archaeological and cultural heritage point of view consideration of a ‘No Development’ option is irrelevant.
- Sites LDS-01, LDS-02 and LDS-04: Existing conservation measures comply with SAHRA Minimum Standards for site conservation, no additional conservation measures for purposes of development, during the construction or operation / use phases are necessary. Site LDS-03: Recommended site conservation measures have largely been complied with (fence and access gate) with only heritage signage of the site still to be done (recommended to be done prior to or during the construction phase for compliance purposes during the operation / use phase).
- The development will have a long-term positive cumulative impact on the identified heritage sites / resources.
- [In the event of any incidental archaeological and cultural heritage resources, as defined and protected by the NHRA 1999¹, being identified during the course of development the process described in ‘Appendix B: Heritage Protocol for Incidental Finds during the Construction Phase’ should be followed. The developer is advised to ensure a sufficient heritage contingency budget to address incidental finds during the course of development.]

The EC PHRA-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.

¹ 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 (≤3cm 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.
- ❖ **Grave and Cemetery Sites** – Marked grave and cemetery sites are routinely associated with the Iron Age and Colonial Period. Unmarked grave sites associated with the Stone Age, Iron Age and Colonial Period may be uncovered during the course of development.

Heritage Compliance Summary – Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat River 16, near Cradock, Chris Hani District Municipality, Eastern Cape				
Map Code	Site	Co-ordinates	Site Significance	Recommendations
Lowlands Hydropower and Distribution				
LDS-01	Colonial Period – Farmstead	S31°54'13.4"; E25°28'27.4"	High Significance Local Grade III-B Field Rating	Permanent Conservation - Conservation measures are in place
LDS-02	Colonial Period – Residence	S31°54'20.0"; E25°28'56.9"	High / Medium Significance Generally Protected IV-A Field Rating	Permanent Conservation - Conservation measures are in place
LDS-03	Colonial Period – Cemetery	S31°54'33.8"; E25°30'02.1"	High Significance Local Grade III-A Field Rating	Permanent Conservation - Permanent fence with access gate & heritage signage indicating the site as a 'Heritage Site' [Fence & access gate have been instated, only signage still to be done]
LDS-04	Colonial Period – Farmstead	S31°54'49.2"; E25°30'22.3"	High Significance Local Grade III-B Field Rating	Permanent Conservation - Conservation measures are in place
A low density of MSA & LSA surface artefacts characterize the study site. Artefact ratios (artefacts: m ²) are however too low to designate the observation as a 'site' or 'occurrence'.				
N/A	Hydro-plant	S31°54'05.9"; E25°29'04.3"	N/A	N/A
N/A	Weir Crest	S31°54'11.9"; E25°28'52.6"	N/A	N/A
N/A	Weir Head	S31°54'12.4"; E25°28'53.9"	N/A	N/A
N/A	Bridge Structure	S31°54'11.7"; E25°28'55.5"	N/A	N/A
N/A	Measuring Structure	S31°54'11.0"; E25°28'56.5"	N/A	N/A
N/A	Inlet	S31°54'29.4"; E25°30'02.4"	N/A	N/A
N/A	Outlet Option 1 (Preferred site)	S31°53'55.4"; E25°29'39.0"	N/A	N/A
N/A	Outlet Option 2	S31°54'22.3"; E25°29'51.6"	N/A	N/A
N/A	Outlet Option 3	S31°54'30.2"; E25°30'00.9"	N/A	N/A
N/A	Powerline (Start)	S31°54'13.5"; E25°28'23.8"	N/A	N/A
N/A	Powerline (End)	S31°54'23.5"; E25°29'57.9"	N/A	N/A

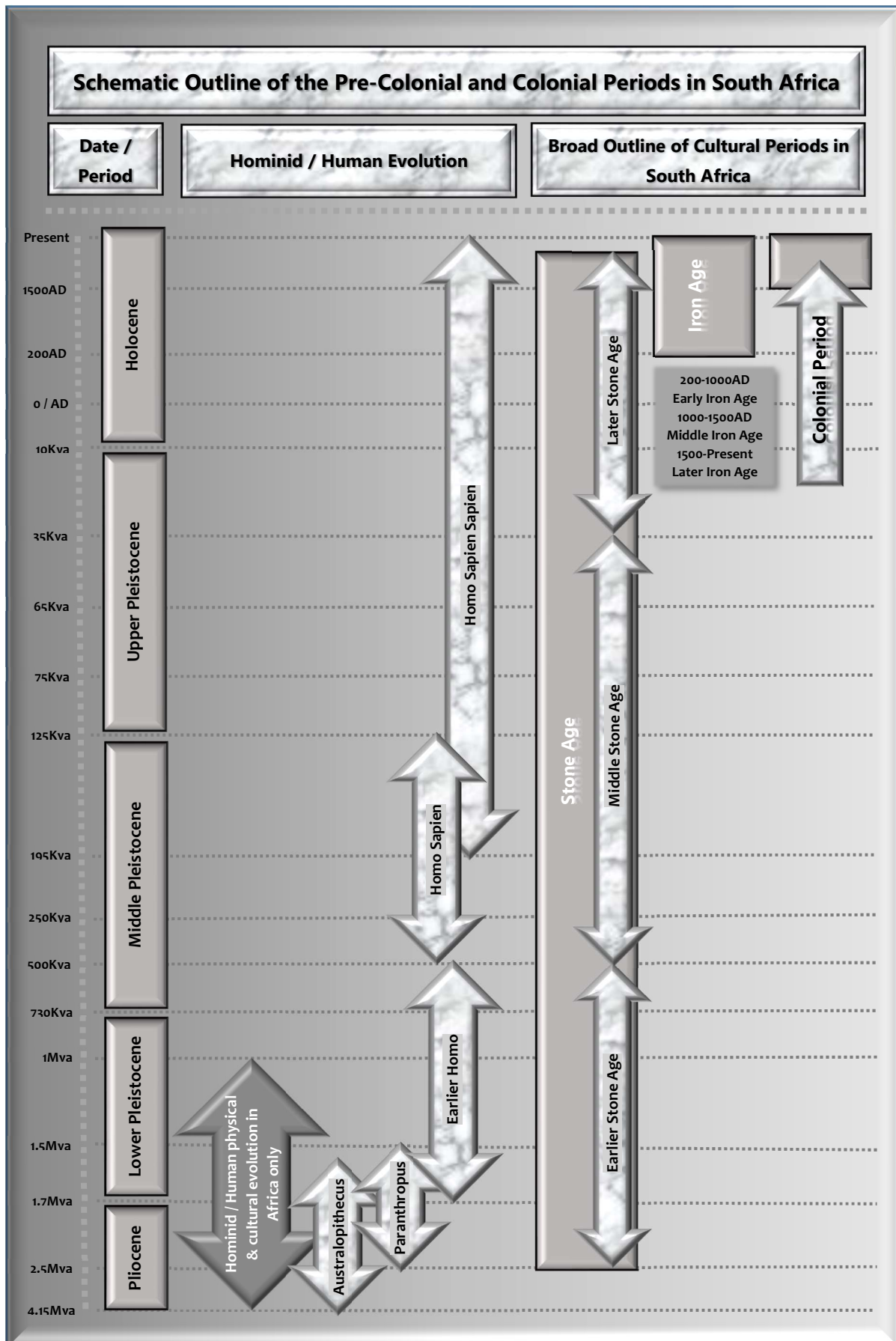
Table 5: Heritage compliance summary

Notes: 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 Impact Assessment (EIA) process.

List of Acronyms and Abbreviations	
AD	Anno Domini (the year 0)
AIA	Archaeological (and Cultural Heritage) 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 Agency
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 metre
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 Agency
PSSA	Palaeontological Society of Southern Africa
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SIA	Social Impact Assessment

Table 6: List of Acronyms and Abbreviations

1. en.wikipedia.org/wiki/List_of_heritage_sites_in_Eastern_Cape [Accessed: December 2020].
2. en.wikipedia.org/wiki/Cradock,_Eastern_Cape [Accessed: December 2020].
3. Isi-Xwiba. 2020. Lowmar (Pty) Ltd – Lowlands Hydropower and Distribution. Background Information Document (BID).
4. Booth, C. (Albany Museum). 2012a. A Phase 1 Archaeological Impact Assessment for the Proposed Establishment of the Rodicon Solar Energy Facility on the Farm Zakfontein 267, between Middleburg and Cradock, Eastern Cape Province.
5. Booth, C. (Albany Museum). 2012b. A Phase 1 Archaeological Impact Assessment: Upgrade of N10 Section 3 from the Riet River (km45.2) to Tarka Bridge (km68.5), Eastern Cape Province.
6. Nel, J. & De Kamper, G. (Archaic HPM). 2008. Final Report – Heritage Resources Scoping Survey and Preliminary Assessment. Transnet Freight Line EIA, Eastern Cape and Northern Cape.
7. South African Government. (No. 107 of) 1998. National Environmental Management Act.
8. South African Government. (No. 25 of) 1999. National Heritage Resources Act.
9. South African Heritage Resources Agency. 2007. Minimum Standards for the Archaeological and Heritage Components of Impact Assessments. (Unpublished guidelines.)
10. Van Ryneveld, K. (ArcheoMaps). 2012. Phase 1 Archaeological Impact Assessment – Upgrade of the N10-4 Cradock [km1.6] to Knutsford [km29], Eastern Cape, South Africa.





Heritage Impact Assessment (HIA) – Lowlands Hydropower and Distribution, Remainder of Portion 15 (Lowlands) of the Farm Kat Kop 16, near Cradock, Chris Hani District Municipality, Eastern Cape

Heritage Protocol for Incidental Finds during the Construction Phase

Should any palaeontological, archaeological or cultural heritage resources, including human remains / graves, as defined and protected by the NHRA 1999, be identified during the construction phase of development (including as a norm during vegetation clearing, surface scraping, trenching and excavation phases), 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-interment / 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.

Resumé
Karen van Ryneveld
2020

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]
 - o 2010 – ASAPA CRM Section: Principal 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

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)

Courses

2016/01 SPA (Safety Passport Alliance) – Petrol Retail [SA Safety Management Training Services – SMST]

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 Principal 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)