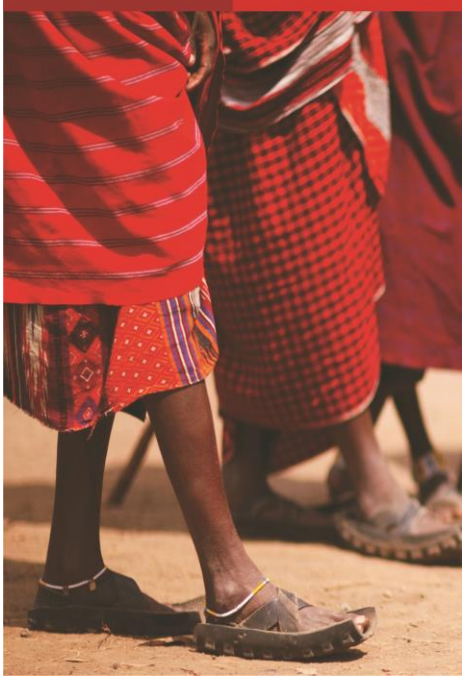

DIGBY WELLS
ENVIRONMENTAL

Slypsteen Bulk Sample Application, Slypsteen 41, Hopetown District, Northern Cape

Heritage Impact Assessment

Project Number:

SUM 2604

Prepared for:

Summer Season Trading 41 (Pty) Ltd

Digby Wells and Associates (South Africa) (Pty) Ltd
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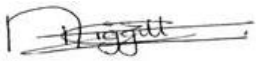
This document has been prepared by Digby Wells Environmental.

Report Type:	**Heritage Impact Assessment**
Project Name:	**Slypsteen Bulk Sample Application, Slypsteen 41, Hopetown District, Northern Cape**
Project Code:	**SUM 2604**

Name	Responsibility	Signature	Date
Natasha Higgitt *Assistant Heritage Consultant*	Background literature; Draft report compilation		22 April 2014
Johan Nel *Manager: HRM Unit*	Background literature; Reconnaissance survey; Impact assessment; Heritage Management Plan; Final report compilation and review		22 April 2014
Casper Joubert *Digby Wells Project Manager*	Reviewer		22 April 2014

EXECUTIVE SUMMARY

Digby Wells Environmental (Digby Wells) was appointed by Summer Season Trading 41 (Pty) Ltd (hereafter SST) for the compilation and submission of an Environmental Management Plan (EMP) in support of a Prospecting Right renewal (Ref. No. NC423PR).

Digby Wells was requested to assist SST with the Prospecting Right renewal that will also include bulk sampling. An EMP is therefore required in accordance with the requirements of the Minerals and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) and MPRDA Regulations in terms of the MPRDA (GN R. 527 of 23 April 2004).

In terms of section (s.) 39(3)(b)(iii) of the MPRDA and s. 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) a Heritage Impact Assessment (HIA) needed to completed as a specialist study as part of the EMP.

The HIA was completed in accordance with sections (ss.) 3(3) and 38(3) of the NHRA.

SST is planning to undertake bulk sampling activities on the Remaining Extent of the farm Slypsteen 41, district Hopetown, as part of its prospecting activities which were approved by the Department of Mineral Resources (DMR) under a prospecting right (Ref. No. NC 423 PR registered under 175-2012PR).

The bulk sampling activities will be undertaken in two phases. Phase one, which is planned for 2014 will comprise of the removal and testing of alluvial gravel. Phase two is planned to be undertaken during 2015 will comprise of the removal additional alluvial gravel. All bulk sampling material will be processed through a mobile beneficiation plant which will be located on site. This process will be managed and funded by Leburu Diamonds. On-site infrastructure for the bulk sampling activities will include a small mobile beneficiation facility. All equipment maintenance and refuelling will be done at an existing farm shed with two $2m^3$ diesel storage tanks.

Sources of risk were considered with regard to development activities defined in s. 2(viii) of the NHRA, which may be triggered by the proposed Slypsteen Project. The following sources of risks were identified:

- Site clearing and preparation of the bulk sample pits will entail the removal of vegetation and topsoil. This activity may therefore result in the following impacts:
  - Destruction of heritage resources with negligible value; and
  - Destruction of heritage resources with medium value.
- Mining the alluvial graves in the bulk sample pit areas will change the natural or existing condition and topography of the land as well as potentially expose significant cultural material deposited over time in the alluvial gravels. This activity will therefore result in the following impact:
  - Change to the archaeological and cultural landscape.

- No development alternatives have been considered. The proposed process is dependent on the presence of alluvial gravels and therefore dictates the mining area. The nature of these gravels is such that any form of underground mining cannot be implemented, that may have otherwise mitigated some of the issues referred to above.

The following is a brief summary of the most important findings:

- The palaeontological potential of the project area is low, but there are high potential areas in the general region;
- Acheulean deposits in the Rietputs gravels are highly significant and can contribute to current and ongoing research;
- Surface ESA, MSA and LSA finds are relatively commonplace and typical of the general region;
- Notwithstanding the relative low significance of individual recorded sites, they represent combined evidence of a significant archaeological and historical cultural landscape that include inter alia:
  - A deep archaeological time depth spanning the past 1.6 million years;
  - A significant relic landscape associated with past and present San society; and
  - A landscape in which historically important events occurred and which can be associated with historic personae.

The values assigned to identified sites are presented in the table below. Only those sites with a value above 'negligible' were considered in the impact assessment.

Resource ID	Description	Value	Designation	Recommended Mitigation
S.35-003	A single MSA blade	2	Negligible	Sufficiently recorded, no mitigation required
S.35-004	A single MSA flake	4	Negligible	Sufficiently recorded, no mitigation required
S.35-001	Acheulean ESA lithics	12	Medium	Mitigation of resource to include detailed recording and mapping, and limited sampling, e.g. STPs.
S.35-002	MSA / LSA Lithic scatter	12	Medium	Mitigation of resource to include detailed recording and mapping, and limited sampling, e.g. STPs.
S.35-005	Lithic scatter	12	Medium	Mitigation of resource to include detailed recording and mapping, and limited sampling, e.g. STPs.
S.35-006	Acheulean lithics	12	Medium	Mitigation of resource to include detailed recording and mapping, and limited sampling, e.g. STPs.
Archaeological landscape	The region in general is characterised as a significant archaeological landscape with deep time depth, including potential palaeontological resources	16	High	Project design must aim to avoid change to resource; Partly conserved, CMP

The impact assessment was only completed for sites that where the Statement of Significance was evaluated as low or higher

Code	Impact	Pre-mitigation:						Recommended mitigation	Post-mitigation:					
		Duration	Extent	Intensity	Consequence	Probability	Significance		Duration	Extent	Intensity	Consequence	Probability	Significance
Neg_SoS	Destruction of Heritage Resources with Negligible Significance	Permanent	Very limited	Very low - negative	Slightly detrimental	Certain	Minor - negative	- No mitigation is required based on these resources' heritage value	Immediate	Very limited	Very low - negative	Negligible	Certain	Negligible - negative
Med-SoS	Destruction of Heritage Resources with Medium Significance	Permanent	Local	Moderately high - negative	Highly detrimental	Certain	Moderate - negative	- These resources will require detailed recording, inclusive of extensive site mapping and surface collection '- A watching brief by a suitably qualified archaeologist during construction and operation will enable additional information to be collected	Permanent	National	Moderately high - positive	Highly beneficial	Likely	Moderate - positive

Code	Impact	Pre-mitigation:						Recommended mitigation	Post-mitigation:					
		Duration	Extent	Intensity	Consequence	Probability	Significance		Duration	Extent	Intensity	Consequence	Probability	Significance
Hi-SoS	Change to archaeological & historical landscape	Project Life	Limited	Moderately high - negative	Moderately detrimental	Certain	Moderate - negative	- Watching briefs need to be implemented during operation in areas where the likelihood of in situ archaeological deposit is high; - Outcrops of Ventersdorp Lava, etc. need to be avoided to reduce possible impact on potential rock art; - Mining operations need to be monitored to minimise potential impacts on tangible heritage; - Rehabilitation of mined areas to be done in a manner where sites will be returned to pre-mining conditions to reduce visual impacts and changes to the sense of place of the landscape; - Regional and local development plans in terms of heritage management and tourism should be considered during subsequent project phases (Mining Right Application, Social and Labour Plans, etc.)	Project Life	Very limited	Moderate - positive	Slightly beneficial	Likely	Minor - positive

RECOMMENDATIONS FOR A HERITAGE MANAGEMENT PLAN

In general, project related mitigation measures such as avoiding resources that were recorded in or near proposed bulk sampling pits are unfeasible. The siting of these pits is dependent on the presence of alluvial diamondiferous gravels. However, the following HMP measures need to be included in the EMP:

- Bulk sampling must avoid as far as possible rocky outcrops and boulders, especially where these comprise Ventersdorp lavas, andesites and dolerites to prevent any risk to possible rock art;
- Where bulk sampling cannot be avoided in areas indicated above, a thorough survey of these areas will need to be done to identify any rock art that may exist;
- If rock art is identified, a HIA must be undertaken to determine appropriate mitigation of identified rock art;
- Periodic monitoring and inspection during construction and the operation life of the proposed Slypsteen bulk sample project needs to be undertaken to ensure the above measures are complied with.

No mitigation will be required for recorded sites that were assigned negligible values. These included:

- Site s.35-003; and
- Site s.35-004.

Mitigation measures will be required for the following sites of medium significance:

- Site s.35-001;
- Site s.35-002;
- Site s.35-005; and
- Site s.35-006.

As these sites are located in areas where alluvial gravels are expected, there is a likelihood of subsurface deposits existing, similar to those discussed by Leader (2009) and Gibbon et al (2009). Recommended mitigation for these resources must therefore aim to record the sites in sufficient detail to ensure, as a minimum, preservation by record. Mitigation should include the following actions:

- Detailed surface mapping and sampling to determine the extent and archaeological context of each site; and
- Due to the superficial nature (i.e. identified as surface scatters) of these sites, Shovel Test Pits are also recommended to determine whether any stratified deposit may be present;
- An archaeological watching brief is further recommended during construction and/or operation to ensure any Acheulean deposit is noted, recorded and fully documented.

The archaeological-historical landscape was found to be a highly significant and potentially sensitive heritage resource. The following actions should ensure post-mitigation impacts reflect at least as minor, positive ratings:

- Implement watching briefs during construction and operation;
- Periodic monitoring of mining operation;
- Avoid potential rock art areas; and
- Rehabilitation of mined areas to pre-mining conditions to reduce visual impacts and changes to sense of place.

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LIST OF ABBREVIATIONS AND TERMS

ASAPA	Association of Southern African Professional Archaeologists
EMP	Environmental Management Plan
ESA	Early Stone Age
GN	Government Notice
HIA	Heritage Impact Assessment
HMP	Heritage Management Plan
LSA	Later Stone Age
MPRDA	Mineral and Petroleum Resources Development Act, 2002
MSA	Middle Stone Age
NAAIRS	National Archives Automated Information Retrieval
NASA	The National Archives of South Africa
NHRA	National Heritage Resources Act, 1999
NKu 3	Northern Upper Karoo
PSDM IDP	Pixley ka Seme District Municipality Integrated Development Plan
SAHRA	South African Heritage Resources Agency
SAHRIS	The South African Heritage Information System
SoW	Scope of Work
SVk 4	Kimberley Thornveld
SVk 5	Vaalbos Rocky Shrubland
TLM	Thembelihle Local Municipality
TM IDP	Thembelihle Municipality Integrated Development
UNESCO	United Nations Educational Scientific and Cultural Organization

1 Introduction

Digby Wells Environmental (Digby Wells) was appointed by Summer Season Trading 41 (Pty) Ltd (hereafter SST) for the compilation and submission of an Environmental Management Plan (EMP) in support of a Prospecting Right renewal (Ref. No. NC 423 PR).

1.1 Terms of Reference

Digby Wells was requested to assist SST with the Prospecting Right renewal that will also include bulk sampling. An EMP is therefore required in accordance with the requirements of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) (MPRDA) and MPRDA Regulations in terms of the MPRDA (GN R. 527 of 23 April 2004).

In terms of section (s.) 39(3)(b)(iii) of the MPRDA and s. 38(8) of the National Heritage Resources Act, 1999 (Act No. 25 of 1999) (NHRA) a Heritage Impact Assessment (HIA) needs to completed as a specialist study as part of the EMP.

The HIA was completed in accordance with sections (ss.) 3(3) and 38(3) of the NHRA.

1.2 Scope of Work

The Scope of Work (SoW) for this HIA complied with s. 38(3) of the NHRA and included *inter alia*:

- Identification and mapping of heritage resources in the proposed bulk sample pits within the larger bulk sample areas;
- Evaluating significance of identified heritage resources commensurate with criteria set out in s. 3(3) of the NHRA;
- Providing suggested grading of identified heritage resources commensurate with criteria set out in s. 7 of the NHRA;
- Assessing the impact of the proposed development on identified heritage resources;
- Recommending feasible mitigation and management plans to ameliorate adverse effects and enhance positive benefits that may result from the proposed development.

2 Restrictions, Limitations, and Knowledge Gaps

The following restrictions apply to this report:

- Due to budget and time constraints the reconnaissance survey focussed on the bulk sampling pit areas;
- Recorded sites were limited to visible surface finds – subsurface archaeological deposit may be exposed during operation;
- Statements of Significance were done in accordance with s. 3 of the NHRA and based on relevant, available information.

3 Project Background Information

Summer Season Trading 41 (Pty) Ltd is planning to undertake bulk sampling activities on the Remaining Extent of the farm Slypsteen 41, district Hopetown, as part of its prospecting activities which were approved by the Department of Mineral Resources (DMR) under a prospecting right (Ref. No. NC 423 PR registered under 175-2012 PR). The bulk sampling activities will be undertaken in two (2) phases. Phase one (1) which is planned for 2014 will comprise of the removal and testing of alluvial gravel, that will be continued as Phase two (2) in 2015. All bulk sampling material will be processed through a mobile beneficiation plant that will be located on site. This process will be managed and funded by Leburu Diamonds. On site infrastructure for the bulk sampling activities will include a small mobile beneficiation. All equipment maintenance and refuelling will be done at an existing farm shed with two 2m^3 diesel storage tanks.

Contact details of the developer, consultant and landowners are provided in Table 3-1,

Table 3-2 and

Table 3-3 respectively.

Table 3-1: Client Contact Details

ITEM	COMPANY CONTACT DETAILS
Company	Summer Season Trading 41 (Pty) Ltd.
Contact person	Salto Veneziano
Cell no	073 160 7625
E-mail address	salto@veneziano.co.za
Postal address	Postnet Suite 227, Private Bag X37, Lynnwood Ridge 0040

Table 3-2: Consultant Contact Details

ITEM	COMPANY CONTACT DETAILS
Company	Digby Wells Environmental
Contact person	Casper Joubert
Tel no	011 789 9495
Fax no	011 789 9498
Cell no	083 643 2479
E-mail address	casper.joubert@digbywells.com
Postal address	Private Bag X10046, Randburg, 2125

Table 3-3: Land Owner Contact Details

ITEM	CONTACT DETAILS
Title Deed Owner	Maria Magdeline Coetzee
Postal address	13 Wild Street, Hopetown, 8750

3.1 Description of Proposed Bulk Sampling Process

The method that will be employed for the proposed Slypsteen Project bulk sampling (and subsequently, subject to the granting of a mining right, future mining) will be opencast shovel and pit mining, i.e. gravels will be removed by excavator machinery. The operations will be restricted to diamondiferous alluvial gravel overlying Dwyka tillite and Ventersdorp lava that form the bedrock in the project area, depicted in section 8 below and in Plan 3. In newer gravels, Dwyka tillite has eroded over time. In such areas the Ventersdorp lava forms the bedrock. Bedrock – both Dwyka and Ventersdorp – will not be intruded or removed as it is not diamondiferous.

Mined gravels will be screened to retrieve material <100 mm. This material will be cleaned and 'de-lumped' and screened again at 38 mm. The secondary screened material will be process by means of a rotary pan or DMS plant to produce diamonds.

Tailings produced from the primary and secondary screening processes will be used as backfill during site rehabilitation. Rehabilitation will be completed concurrent to sampling operations where exhausted open pits will be backfilled with the tailings material.

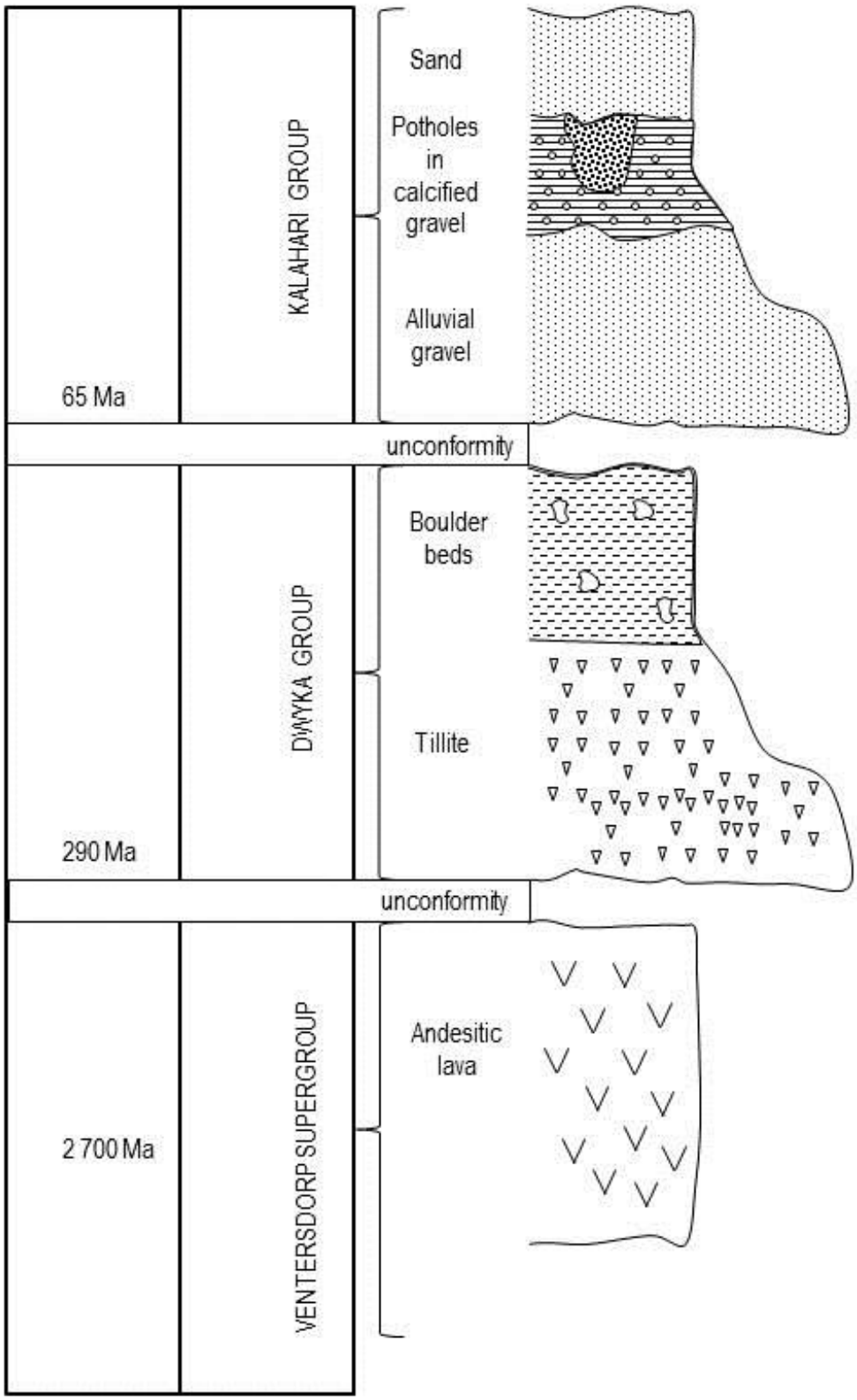


Figure 3-1: Schematic representation of diamondiferous deposit in Slypsteen Project area (adapted from Nel 2005)

4 Development / Planning Context

The proposed Slypsteen project is located in the Northern Cape Province on the Remaining Extent of the farm Slypsteen 41. The project area is situated nearly equidistant from Hopetown and Douglas. Detailed geographical information is provided in Table 4-1 below, and plans depicting the project location attached as Appendix A: Plan 1, Plan 2 and Plan 3

Table 4-1: Geographical information details for the Slypsteen Project

Province	Northern Cape
Magisterial District	Hopetown Magisterial District
District Municipality	Pixley ka Seme District Municipality
Local Municipality	Thembelihle Local Municipality
Nearest towns	Hopetown (33 km) and Douglas (33 km)
1: 50 000 topographical map	2923 BD Torquay
Relative centre co-ordinates of the project area	-29.359587°;23.897453°
Recording method	Google Earth
Rezoning required	None, project area has already been zoned for mining under an Old Order Mining Right

The development and planning context within which the Slypsteen Project will operate was summarised from the following relevant sources:

- Statistics South Africa (http://beta2.statssa.gov.za/?page_id=993&id=thembelihle-municipality, accessed 13/3/2014);
- *Census 2011 Municipal report – Northern Cape*. Statistics South Africa. Pretoria: Statistics South Africa, 2012;
- *Pixley ka Seme District Municipality Integrated Development Plan for 2011-2016*. Pixley ka Seme District Municipality. De Aar: Pixley ka Seme District Municipality, 2011; and
- *Thembelihle Municipality Integrated Development Plan for 2013/2014*. Thembelihle Municipality. Hopetown: Thembelihle Municipality, 2013

The socio-economic status of Hopetown was inferred from statistics for Thembelihle Local Municipality (TML) from Statistics SA (2012 & 2013). The TML is approximately 8 023 km^2 in extent with a total population of 15 701 at a density of two persons per square kilometre (Statistics SA 2013). Of the total population only 5 393 (34.4%) people were considered economically active out of a 62.8% working age (15-64 years) population. The area was therefore characterised as impoverished with a high general national unemployment rate of 28.4% (ranked 108 nationally) and an even higher national youth (15 to 34 years)

unemployment rate of 35.2% (ranked 117 nationally). This also results in a high dependency ratio of 59.3%, possibly compounded by a low education rate. These figures are summarised in Table 4-2.

Table 4-2: Education, employment and dependency figures for TLM (adapted from Statistics SA)

Education	
Group	**Percentage**
No Schooling	3,7%
Some Primary	48,8%
Completed Primary	7,1%
Some Secondary	29,9%
Completed Secondary	8,3%
Higher Education	0,6%
Not Applicable	1,5%

Employment	
Status	**Number**
Employed	3 861
Unemployed	1 532
Economically active = Employed + Unemployed	*5 393*
Discouraged Work Seeker	687
Not Economically Active	3 776

Dependency ratio	**59.3%**

Average household income, depicted in Table 4-3, ranged from none (10.4%) to greater than R 2 457 601.00 (0.1%) with the majority (25.8%) of households averaging R 19 601 to R 38 200.00 (Statistics SA 2013).

Table 4-3: Average Household Income per annum (adapted from Statistics SA 2013)

Income	Percentage	Income	Percentage
No income	10,4%	R1 - R4,800	2,4%
R4,801 - R9,600	4,2%	R9,601 - R19,600	20,2%
R19,601 - R38,200	25,8%	R38,201 - R76,4000	17,8%
R76,401 - R153,800	9,2%	R153,801 - R307,600	6,2%
R307,601 - R614,400	2,9%	R614,001 - R1,228,800	0,6%
R1,228,801 - R2,457,600	0,2%	R2,457,601+	0,1%

The primary employment sectors in the TML are described in the Thembelihle Municipality Integrated Development Plan (TM IDP, 2013), based on stakeholder consultation: agriculture is the main contributor at 70% and mining the least at 5% (see Table 4-4).

Table 4-4: Primary employment figures for TML (TM IDP 2013)

Employment sector	Percentage
Agriculture (all farm labour, plus retail at three cooperatives)	70%
Municipal	45%
Business (all private, retail, office and service providers)	40%
Government (all teachers, local government workers)	25%
Building and construction	20%
Mining	5%

Aspects considered for potential economic growth in the TM IDP (2013) included inter alia:

- Value added agricultural products such as establishing product specific factories;
- Expansion of transport sector;
- Market regional tourism potential with specific reference to:
  - Agri-tourism, including game farming and hunting;
  - De Bron;
  - Historical townscapes;
  - Natural Karoo fauna and flora;
  - Orange River; and
  - San resettlement [sic].
- Expand agriculture, including:
  - Extend intensive livestock feedlot potential;
  - Increase land area for small stock farmers;
  - Land reform to develop irrigation land for emerging farmers.
- Develop precious and semi-precious mining.

The TM IDP further identified tourism as a specific project objective to increase sustainable, permanent employment. An identified project output is “heritage protection”. The target identified target group includes unemployed youth and women, “poorest of the poor” and SMMEs (TM IDP 2013:73).

This project objective is reiterated in the Pixley ka Seme District Municipality Integrated Development Plan (PSDM IDP) as part of its Local Economic Development (LED) strategy (PSDM IDP 2012: 46). The PSDM IDP (2012: 55) makes specific reference to Hopetown

tourist attractions that include a Second Anglo Boer War concentration camp cemetery, the Battle of Belmont and the Old Wagon Bridge.

In addition to tourism / heritage opportunities, the PSDM convened a conference in 2010 to "provide insight around virgin opportunities that could be exploited in key sectors of the district economy, namely: mining, tourism, manufacturing, retail, agriculture and agro-processing and also in the renewable energy sector, namely: solar, wind, hydro, bio-mass, bio-digestion and geo-thermal development" (PSDM 2012: 177). This conference took the following resolutions to enable the identified opportunities:

- Developing infrastructure;
- Initiation a cross boundary focus on tourism;
- Pursue mining potential and mineral beneficiation; and
- Implement rural industrialisation and create development zones.

With regard to tourism / heritage, the PSDM IDP (2012: 178) identified the "enhanced promotion and site development of the district's Anglo Boer war battlefields" and "better mapping and marketing of San Rock paintings" as priority activities.

In summary, the Slypsteen Project is therefore located within a planning context that will, if implemented, increase potential development that may result in cumulative impacts on diverse heritage resources over time. With regard to potentially negative impacts, intensified agriculture – especially irrigated lands – arguably poses the greatest risk to tangible heritage sites. Industrialisation and urban development may similarly increase risk to historical townscapes and landscapes. Within the TLM, mining is a relative minor contributor in terms of employment, but increased beneficiation could result in significant impacts as well.

Considering positive cumulative impacts, sound heritage management practices could significantly contribute to sustainable employment in the tourism and heritage sectors. This could include conservation plans for historical settings and townscapes such as Anglo Boer war sites that would require skills development and transfer to local communities, who can be tasked with monitoring and management of sites. In addition, presentation and interpretation of sites can potentially directly contribute to tourism development.

5 Expertise of the Specialists

Natasha Higgitt has completed a BA Honours degree in Archaeology at the University of Pretoria. She worked as an intern at the Albany Museum in Grahamstown where she assisted with three Heritage studies in the Northern Cape. She currently holds the position of Assistant Heritage Consultant at Digby Wells, where she has worked for over two years with experience in Heritage Impact Assessments (HIA's) in Limpopo and Mpumalanga. She has experience in international heritage and social projects in Liberia.

Johan Nel who completed a Bachelor of Arts (BA) in Archaeology and Anthropology and a BA Honours degree in Archaeology at the University of Pretoria. He has been in employ with Digby Wells since 2010 and currently holds the position of HRM: Unit Manager.

Both of the above specialists are members of the Association of Southern African Professional Archaeologists (ASAPA) and have Cultural Resources Management Accreditation Status.

The curriculum vitae of the specialists are presented in Appendix A.

6 Methodology

The research methodology followed a relatively generalised archaeological landscape approach employing both qualitative (text-based) and quantitative (field-based) methods. This approach is innately multidisciplinary as it underlines the connections between material culture, the cultural landscape and the natural environment thereby providing the necessary context within which any identified heritage resources can be interpreted and assessed.

The research methodology included several steps outlined below.

6.1 Background Information / Data Collection

Background information was identified and reviewed (analysed) to obtain salient information summarised in this NID to provide the necessary background. Information sources that were consulted are summarised listed below and listed in section 13. It included text-based and cartographic sources, and database information.

6.1.1 Published Literature

Published literature that was found relevant to this study in terms of cultural heritage included:

- Boshoff, W. 2006;
- Burchell, W. 1822;
- Campbell, J. 1815;
- Gibbon et al. 2009;
- Henderson, Z. 2002;
- Humphreys, A. J. B. 1970 & 1974;
- Leader, G. M. 2009;
- Maggs, T. M. 1976.
- Morris, D. 1988, 2005.
- Raper, R. E. 1987;
- Waters, W. H. 1904; and
- Wiid, R. 2011.

6.2 Reviewed Heritage Reports

Previously completed heritage studies were reviewed to expand on the background described above. The findings provide evidence-based inferences to be made with regard to the potential for, and description of heritage resources that are likely to occur in the project region. The following heritage cases and reports were found to be relevant:

- Rossouw, L. 2013. Phase 1 Palaeontological Impact Assessment of the Proposed Construction of the North and South Sidala Hydroelectric Power Sites on the Orange River, Siyancuma and Thembelihle municipalities, NC. Langehovenpark: Palaeo Field Services (SAHRIS Case ID: 3264 & 3266);
- Morris, D. 2009a. Report on a Phase 1 Archaeological Impact Assessment at Bucklands Settlement near Douglas, Northern Cape. Kimberly: McGregor Museum (SAHRA Ref: 9/2/038/0001);
- Morris, D. 2009b. Report on a further Phase 1 Archaeological Impact Assessment at Bucklands Settlement near Douglas, Northern Cape. Kimberly: McGregor Museum (SAHRA Ref: 9/2/038/0001);
- van Ryneveld, K. 2005. Cultural Resources Management Impact Assessment: (Portions of) Ettrick 182; Hopetown District, Northern Cape, South Africa. Kimberley: McGregor Museum. (SAHRA Ref: 9/2/038/0001);
- van Ryneveld, K. 2013a. Phase 1 Archaeological Impact Assessment: The North Hydroelectric Power Site, Orange River, Siyancuma Local Municipality, Northern Cape, South Africa. Beacon Bay: ArchaeoMaps Archaeological Consultancy (SAHRIS Case ID: 3264);
- van Ryneveld, K. 2013b. Phase 1 Archaeological Impact Assessment: The South Hydroelectric Power Site, Orange River, Thembilihle Local Municipality, Northern Cape, South Africa. Beacon Bay: ArchaeoMaps Archaeological Consultancy (SAHRIS Case ID: 3266).

6.2.1 Databases

A review of relevant databases was completed to identify potential heritage resources within the project area. These included:

- The National Archives of South Africa (NASA);
- The Genealogical Society of South Africa (GSSA);
- The University of the Witwatersrand Archaeological Site Database;
- The South African Heritage Information System (SAHRIS); and
- The Artefacts Architectural Online Database.

Table 6-1: Archival references for the Slypsteen Project area

Source	Vol no	Reference no	Description	Dates
PAE	685	H72/123/ER	Hope Town. Slypsteen Primary School. Inspection Report.	1933-1937
PAE	685	H72/123/ER	Hope Town. Slypsteen Primary School. Inspection Report.	1938-1941
PAE	967	H72/123	Hope Town Slypsteen Primary School. Administrative And Personnel Affairs.	1932-1934
PAE	967	H72/123	Hope Town Slypsteen Primary School. Administrative And Personnel Affairs.	1935-1941

6.2.2 Historical Layering

Historical layering is a process whereby diverse cartographic sources from various time periods are layered chronologically using GIS. The rationale behind historical layering is threefold, as it:

- Enables a virtual representation of changes in the land use of a particular area over time;
- Provides relative dates based on the presence/absence of visible features; and
- Identifies potential locations where heritage resources may exist within an area.

The cartographic sources used in this study included:

- Cape Reconnaissance Map: Douglas. 1913

Table 6-2: Historical aerial photographs used for the Slypsteen Project area

Aerial photographs						
Job no.	**Flight plan**	**Photo no.**	**Map ref.**	**Area**	**Date**	**Reference**
351	001	04894	2923	Douglas/Hopetown	1955	351/1955
351	002	04931	2923	Douglas/Hopetown	1955	351/1955
610	007	00820	2923 2924	Douglas	1968	610/1968
498/173	008	04708	2823 2923	Douglas	1981	498/174/1981
1001	009	00378	2923	Douglas	1997	1001/1997

6.3 Field Reconnaissance Survey

A reconnaissance survey was undertaken on 6 and 7 March 2014 of the proposed bulk sample area. For the purposes of this report the survey focussed on proposed pit areas.

These areas were surveyed on foot to identify, record and document visible heritage resources. A track log, depicted in Plan 5, was kept and identified sites recorded by means of GPS and photographed (10 cm scale). The sites were plotted and depicted in Plan 5.

As expected, identified sites were limited to Stone Age artefacts (See Section 8). Where concentrations were noted, relative density of lithics was determined based on number of lithics per approximately 25 m^2 (an approximate 5 m x 5 m square was paced out).

6.4 Site Naming

For the purpose of this report site naming employed the following conventions:

- Sites identified in previous assessments were referred to by their respective report site names and prefixed with the relevant South African Heritage Resources Agency (SAHRA) Case ID (in this case 5029) or report reference number;
- Sites identified in previous assessments without SAHRA references were referred to by their respective report site and prefixed with the report author and date;
- All newly identified sites were named using this heritage case ID, followed by the map sheet number and reference to the relevant NHRA section suffixed with the site number; and
- Reference to sites and resources that have been formally declared are made using the official gazetted names.

Sites discussed in the text of this report are summarised using only the site number, e.g. Site s.35-001.

6.5 Statement of Significance / Heritage Value

To allow for the implementation of appropriate management measures, the significance (see Table 6-5) of individual identified heritage resources was determined. This was achieved by determining the potential contribution of heritage resources in terms of aesthetic, historic, scientific and social values (see Table 6-3), taking into account the integrity of the resource's fabric (see Table 6-4). The methodology – detailed in Appendix D - to determine heritage value fulfils the requirements stipulated in section 3 of the NHRA.

The formula used to assign values is:

Significance = Value x Integrity

where

Value = average of Aesthetic Value + Historic Value + Scientific Value + Social Value

Table 6-3: Ranking and description used to determine values

Ranking	Description (guidelines for determining value)
0	The resource exhibits attributes that may be considered in a particular dimension, but it is so poorly represented that it cannot or does not contribute to the resource's overall value.
1	Common, well represented throughout diverse cultural landscapes
2	Generally well represented but exhibits superior qualities in comparison to other similar examples.
3	The resource exhibits attributes that are rare and uncommon within a region. It is important to specific communities.
4	Rare and uncommon, value of national importance.
5	The resource exhibits attributes that are considered singular, unique and/or irreplaceable to the degree that its significance can be universally accepted.
-	Not assessed - dimension and/or attribute not considered in determining value.

Table 6-4: Ranking and description used to determine integrity

Ranking	Description (guidelines for determining integrity)
0	No information potential, complete loss of meaning, Fabric completely degraded, original setting lost
1	Fabric poorly preserved, limited information, little meaning ascribed, extensive encroachment on setting
2	Fabric is preserved, some information potential (quality questionable) and meaning evident, some encroachment on setting
3	Fabric well preserved, good quality information and meaning evident, limited encroachment
4	Excellent preservation of fabric, high information potential of high quality, meaning is well established, no encroachment on setting

Table 6-5: Scores determining Statement of Significance of heritage resources

Score	Description	Rating
0-5	Resource of negligible heritage value	Negligible
6-10	Resource of low heritage value; change to resource not significant	Low
11-12	Resource of medium heritage value: project mitigation must aim to reduce negative change	Medium
13-14	Resource of medium high heritage value: heritage mitigation to reduce negative change	Medium High
15-17	Resource of high heritage value: resource must be partly conserved and heritage mitigation implemented to reduce negative change	High
17-20	Resource of very high heritage value: resource must be preserved/conserved and included in a management plan	Very High

The Statement of Significance has direct bearing in assessing the intensity of potential of impacts on identified heritage resources.

6.6 Impact Assessment

The assessment of the significance of impacts on heritage resources takes into account the significance of identified heritage resources. Impacts are first defined as relative generic sources of risk described as issues. Each issue is then assessed in respect of its potential impact on heritage resources with similar significance ratings. The impact assessment further only considers resources that are rated above negligible significance. The assessment is also applied in pre- and post-mitigation scenarios and makes provision for negative and positive impacts. A detailed methodology is attached as Appendix D.

The formula used to rate the significance of impacts is:

Impact Significance = Consequence x Probability

where

Consequence = Duration + Extent + Intensity (positive or negative)

7 Sources of Risk

Sources of risk were considered with regard to development activities defined in s. 2(viii) of the NHRA, which may be triggered by the proposed Slypsteen Project. This section of the Act defines development as “any physical intervention, excavation, or action, other than those caused by natural forces, which may…in any way result in a change to the nature, appearance or physical nature of a place, or influence its stability and future well-being”.

Relevant activities are discussed as issues below. These issues formed the basis of the impact assessment described in section 10 below.

7.1 Issue 1: Site Clearing and Preparation

Site clearing and preparation of the bulk sample pits will entail the removal of vegetation and topsoil. This activity will therefore result in the following impacts:

- Destruction of heritage resources with negligible value; and
- Destruction of heritage resources with medium value.

7.2 Issue 2: Sampling Alluvial Gravels

Sampling the alluvial graves in the bulk sample pit areas will change the natural or existing condition and topography of the land as well as potentially expose significant cultural material deposited over time in the alluvial gravels. This activity will therefore result in the following impact:

- Change to the archaeological and cultural landscape.

7.3 Alternatives Considered

No development alternatives have been considered. The proposed process – as described in section 3.1 above – is dependent on the presence of alluvial gravels and therefore dictates the mining area. The nature of these gravels is such that any form of underground mining cannot be implemented, that may have otherwise mitigated some of the issues referred to above.

8 Discussion

8.1 Regional Geology & Palaeontological Potential

The regional geology within which the proposed Slypsteen Project is located comprises the Dwyka and Kalahari Groups of the Karoo Supergroup formation (See Plan 4). The Allanridge Formation of the Ventersdorp Supergroup is found to the northeast across the Orange River.

The Dwyka Group is characterised by the presence of glacial, interglacial and post-glacial siliciclastic sediments. Large boulders were deposited as a result of melting glaciers (Nel, 2005). In addition, glacial pavements also occur, such as the Bucklands, Blaauboschdrift

and Driekopseiland Glacial Pavements. All three sites are declared Grade II provincial heritage sites (GN 5184, 1996; GN 413, 1994 and GN 1078, 1975).

The Kalahari Group is characterised by fluvial gravels, sands, lacustrine and pan mudrocks, evaporites, aeolian sands, pedocretes (especially calcrete).

The Allanridge Formation represents the oldest geological formation in the area (2714 Ma). The formation is characterised by solidified andesitic to basaltic amygdaloidal lavas (Figure 8-1) with subordinate siliciclastic sediments such as breccias, conglomerates (Figure 8-2), sandstones, mudrocks, with minor limestones and cherts in the upper part of succession (Nel, 2005; SAHRIS, 2014).

Figure 8-1: Example of Ventersdorp / Allanridge lava found within the project area

Figure 8-2: Example of Ventersdorp / Allanridge conglomerate identified within the project area

Potential palaeontological material that could be found in the formations discussed above includes:

- Dwyka Group (SAHRIS, 2014):
  - Interglacial and post-glacial trace fossil assemblages and organic-walled microfossils;
  - Rare marine invertebrates such as molluscs;
  - Vascular plants; and
  - Invertebrate body fossils such fish.
- Kalahari Group (SAHRIS, 2014):
  - Alynomorphs;
  - Rhizomorphs or root casts and burrows such as fossilised termitaria;
  - Rare vertebrate remains such as mammals, fish, ostrich egg shell etc.)
  - Diatom-rich limestones;
  - Freshwater stromatolites; and
  - Freshwater and terrestrial gastropods, bivalves, ostracods and charophytes
- Allanridge Formation (SAHRIS, 2014):
  - Lacustrine stromatolites; and
  - Microfossils recorded from sediments of the Platberg Group.

Notwithstanding the potential palaeontological material listed above, the proposed Slypsteen Project is located within an area considered to have low palaeontological potential or sensitivity as illustrated in Figure 8-3. This has been confirmed in a Phase 1 Palaeontological Impact Assessment undertaken by (Rossouw, 2013).

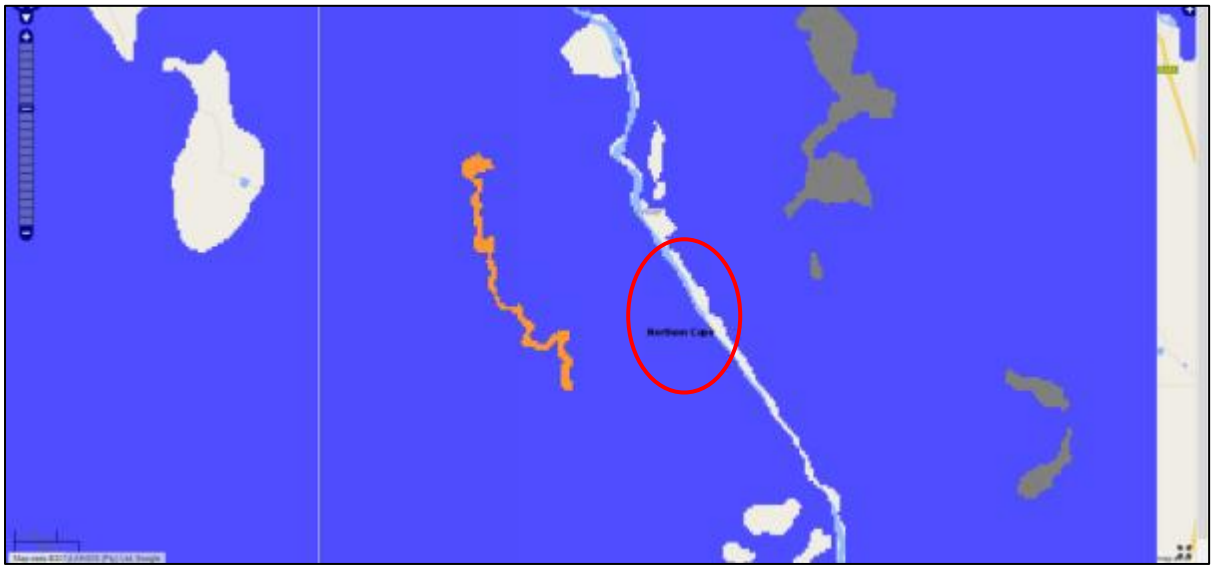


Figure 8-3: PalaeoSensitivity map of the Slypsteen Project area showing low palaeo sensitivity (SAHRIS, 2014)

The proposed Slypsteen Project will prospect for and mine diamonds in the Rietputs A and B terraces. These gravel complexes are restricted to Dwyka Group sediments preserved in pre-Karoo valleys (Nel, 2005). The risk to any palaeontology is therefore low. However, there is a relative high likelihood of exposing Stone Age material during mining operations (discussed in more detail under section 8.3 below).

8.2 Soils, Climate and Vegetation

The geology to an extent influences the soils present in the project area. The soils and climate subsequently influence the typical natural occurring vegetation, which, in turn, affects potential long-term, sustainable pre-industrial human settlement. The proposed Slypsteen Project is situated within the Kimberley Thornveld (SVk 4) and Vaalbos Rocky Shrubland (SVk 5) types of the Eastern Kalahari Bushveld Bioregion, Savanna Biome (Mucina & Rutherford, 2006: 758). Immediately to the west of the project area lies in the Northern Upper Karoo (NKu 3 type of the Upper Karoo Bioregion, Nama-Karoo Biome (Mucina & Rutherford, 2006: 756).

All three types are situated in a summer to early autumn rainfall region with a mean annual precipitation (MAP) of between approximately 250 mm and 500 mm per annum (Mucina & Rutherford, 2006: 340, 516, 517).

The SVk 3 lies on andesitic lavas of the Allanridge Formation and fine-grained Karoo Supergroup sediments (Mucina & Rutherford, 2006: 516). Soils are 60 cm to 1 200 cm deep sandy to loamy Hutton soil forms (ibid.) Woody vegetation is dominated by *Acacia* species – especially *A. erioloba, A. tortilis, A. karroo* – several woody and succulent shrubs and grasses. Grasses include important grazing species such as *Eragrostis, Aristida* and *Cymbopogon* species (Mucina & Rutherford, 2006: 517).

The SVk 4 type is typically found the Ecca and Dwyka Group sediments (highly fragmented) and on the Allanridge Formation lavas (Mucina & Rutherford, 2006: 517). This fragmented nature has given rise to erosion terraces marked by dolerite sills-formed ridges, plateaus and slopes of low koppies (ibid.). The sills overlies alternating layers of sedimentary mud- and sandstone where the typical soil forms include stony Mispah and gravel-rich Glenrosa forms (ibid.) The alluvial gravels proposed to be mined are part of the latter form. The woody vegetation present in the SVK 4 type includes a diverse range of species dominated by evergreen shrubs such as *Tarchonanthus camphoratus, Olea europea* and *Rhus burchelli* (ibid.) Grasses are similar to those found in SVk 3.

The NKu 3 type in the project area is situated on shales of the Volksrust Formation (Ecca Group) and diamictites of the Dywka Group. As with SVk 4 Jurassic Karoo dolerite sills sustain the vegetation in places (Mucina & Rutherford, 2006: 340). Superficial Kalahari Group calcrete deposits are widespread (ibid.) This gives rise to variable soil forms such as shallow to deep apedal freely drained soils and very shallow Glenrosa and Mispah forms, similar to SVk 4 (ibid.). Due to these soil types the vegetation is dominated by dwarf karoo shrubs, grasses and *A. mellifera* (ibid.)

The geology, soils, vegetation and climate described briefly above would not have enabled sustainable grain-based agriculture in the region. This premise is demonstrated by the absence of long-term Iron Age farming settlement in the region.

The region would however have sustained a diverse range of game species – especially in a seasonal context. The presence of LSA hunter-gatherer and San evidence lends support to this assertion (Henderson, 2002; Humphreys A. J., 1974 and Mason, 1954) In addition, late LSA and more recent small stock herders would have sustainably farmed and herded flocks of sheep and goats in the region, evidence by the presence of very early ceramics predating Bantu-speaking farming settlement (Maggs, 1976) and possible stonewalled small stock enclosures – Magg's Type R settlements (Maggs, 1976).

8.3 Stone Age Heritage

The general study region is well-known for its Stone Age heritage include all three periods: Early (ESA, c. 1.8 million years (Ma) to 250 thousand years (Ka) ago), Middle (MSA, c. 250 Ka to 50 Ka ago) and LSA (c. 50 Ka to early 19th century CE).

The Rietputs gravel complexes (cf. section 8.1 above) have produced *in situ* early Acheulean ESA lithics at the Rietputs type site at Windsorton approximately 135 km north of the proposed Slypsteen Project (Gibbon, Granger, Kuman, & Partridge, 2009 and Leader IV, 2009). Artefacts such as handaxes, cleavers and cores were uncovered at depths between 6 m and 15 m below surface. The depositional history enabled cosmogenic nuclide dating to be done that provided dates of c. 1.8 Ma to 1.35 Ma (Gibbon, Granger, Kuman, & Partridge, 2009).

Similar material was identified in an abandoned working in the Slypsteen Project area during the field reconnaissance survey completed for this HIA, depicted in Appendix B. This is highly significant as the cores sampled at Rietputs provided evidence for a degree of

preparation not previously identified in the early Acheulean. Leader (2009: 85) contends that this may be indicative of more complex cognitive functioning by tool producing hominids than previously thought. The finds at Slypsteen could therefore contribute meaningfully to further regional research. This supported by Leader (2009: 86): “The importance of future work on the Vaal gravels cannot be stressed enough as it can now be seen clearly that hominids in South Africa had an early idea of controlled, efficient, knapping for best results”.

The reconnaissance survey further identified and recorded other ESA, MSA and LSA material (refer to Appendix B for site descriptions). This is consistent with findings reporting on by (Morris, 2005; 2009a and 2009b) and (van Ryneveld, 2005; 2013a and 2013b).

Morris recorded a cache of ostrich eggshell containers on the farm Saratoga, approximately 9 km north-east of the project area (Morris, 2005). Morris (2009a) identified LSA lithics including flakes and a hornfels pebble core during an archaeological reconnaissance survey on the farm of Bucklands, approximately 30 km north from the Slypsteen Project area. During a follow up survey on the same property, Morris (2009b) identified more LSA material: flakes, cores and ostrich eggshell fragments and lithics included flakes and cores produced from hornfels. He states that this is representative of typical “low density distributions within a layer/s beneath the present surface” (Morris 2009b: 4) with very little archaeological significance (Morris 2009b: 7-8).

Van Ryneveld (2005) similarly identified MSA material on the farm Ettrick 182 (located adjacent to the Slypsteen Project across the Orange River). The artefact types recorded included scrapers, points, convergent flakes, denticulates and noteched scrapers (van Ryneveld 2005: 4). The site was considered of low archaeological significance, although it was stated that it extended “over a large area” (van Ryneveld 2005: 6)

Two other archaeological surveys were undertaken by van Ryneveld nearby the proposed Slypsteen Project. Van Ryneveld (2013a; 2013b) recorded 11 MSA and LSA ‘occurrences’ in total with varying artefact density ratios. All sites were assigned medium significance values.

These site recordings are consistent with the regional MSA and LSA archaeology for example:

- Material recovered from Dikbosch Shelter, around 75 km north from the Slypsteen Project (Humphreys A. J., 1974);
- Material recovered from Thomas Farm, approximately 40 km east of the Slypsteen Project (Henderson, 2002).

Regular references to the presence of rock art on Slypsteen are made (van Ryneveld 2013a, 2013b; SARADA 2010), however, there is unclear indication as to which portions of the farm these sites are located. The reconnaissance survey undertaken for this HIA did not identify any sites in the surveyed areas. Rock art in the region is though highly significant. It is representative of the so-called !Xam ǂKhomani ‘heartland’ within which the Slypsteen Project falls. This area has been in the Tentative List of the UNESCO World Heritage Convention (Department of Environmental Affairs and Tourism, 2014). The area is further

important as several of Lucy Lloyd and Wilhelm Bleek's San 'informants' were from this area. The insights into traditional San culture offered by these people to Lloyd and Bleek provided researchers with invaluable information concerning San society. To a large extent, the people interviewed by Lloyd and Bleek also represented some of the last pre-industrialised San. This importance is captured in the UNESCO Tentative List inscription:

> *The area south of Upington was home to communities of the !Xam; a clan of the San (or Bushmen) who inhabited southwestern Africa for thousands of years until displaced by later settlement. Here some survivors became labourers on farms but their language and culture has disappeared. However, in the 1870's Dr Wilhelm Bleek and Miss Lucy Lloyd began recording the language, folktales and spiritual beliefs of a number of !Xam brought to prison in Cape Town. These individuals were amongst the last repositories of the language and belief system of the !Xam and Bleek and Lloyd's work links many beliefs to known features in the landscape, providing a window of understanding into the blending of folklore and geography by the !Xam. The information has enabled archaeologists to interpret the rich rock art legacy left by these and other San. The !Xam area in a unique way links the memory of a vanished people, their language and culture, spiritual connection to their environment and contribution to the meaning of Southern African rock art. It is a unique memorial to lost pre-colonial cultures in Africa. By comparison the area in the north of Upington is home to the ǂKhomani who until recently were thought to have disappeared, in this instance due to their removal from ancestral lands in the mid¬20th Century. In 1996 several elderly speakers of their language and carriers of the culture were identified. In 1999, activism by younger descendants led to restitution of land to the south of the Kgalagadi Trans-frontier Park, the original home of the community, and restoration of certain land use rights within the Park. Young members of the community have since worked with elders on cultural mapping of these lands and 'reconstruction' of a cultural landscape, not dissimilar to that of the !Xam. There is a strong revival of traditional practices and use of this landscape in a manner that enhances conservation thereof. The ǂKhomani are the last surviving indigenous San community in South Africa and their living cultural landscape is an important aspect of national culture, one that contrasts well with the !Xam area to the south. The two areas are the only San cultural landscapes that have enjoyed this level of attention and concerning which there is hence a fair depth of knowledge. Although covering extremely large areas the two components are in relative close proximity and are considered as a single nomination illustrating the heritage of a unique group of African cultures most of which have disappeared without record of the knowledge and practices they embodied. (http://whc.unesco.org/en/tentativelists/1910/, accessed 19/03/2014).*

8.4 Pastoralists

Pastoralists are defined in context of this report as societies that kept and herded small stock whilst still practicing nomadic hunter-gatherer lifestyles. Certain stonewalled sites are

associated with these groups. Maggs (1976) identified 'Type R' settlements along the Riet River, approximately 80 km east from the Slypsteen Project, typical of pastoralist groups. These sites are found only in the region and comprise of a single central primary enclosure with a number of smaller enclosures located around it. Some of the smaller enclosures have a surrounding wall and secondary walling has been identified that link the primary to the secondary enclosures. Pottery associated with these settlements is considered distinct from Iron Age or LSA traditions. These settlements have been dated to between the 16th and 19th centuries (Maggs, 1976).

Burials have been located within these settlements which show evidence of potential coastal trading routes as some of the grave goods include cowrie shell (*Cypraea annulus*), South African abalone (*Haliotis midae*) pendants and South African scallop (*Pecten sulcicostatus*) pendants. Cowrie shells are predominately found from Port Edward to Inhambane; abalone is mostly found from St. Helena Bay to East London and the South African scallop is found from False Bay to Mossel Bay (Humphreys A. B., The Remains from Koffiefontein Burials Excavated by W. Fowler and Preserved in theMcGregor Museum, Kimberley, 1970). The human remains have been identified as Khoisan in their physiology. Similar burials were discovered 30 km north from the project area on the farm St Clair, as well as at the Driekopseiland site where more Type R settlements were found (Humphreys A. B., 1982 and Mason, 1954). These settlements survived until the appearance of European settlers during the early 1800's.

8.5 Historical / 'European' Period

Permanent European settlement of the region started in the early 19th century. Early descriptions of the interior include those of Burchell (1822) and Campbell (1815). Burchell for instance camped at the confluence of the Vaal and Riet Rivers in 1811 (around 40 km north of the Slypsteen Project). The London Missionary Society established a settlement in 1838 that was subsequently renamed Douglas, after Sir Percy Douglas, the Lieutenant-Governor of the Cape Colony (Raper, 1987). Hopetown was founded in 1853, and became a municipality in 1858.

In 1867 the first diamond was discovered by Erasmus Jacobs near Hopetown on De Kalk, approximately 16 km north-west of the project area. The ruins of the Jacobs family residence are declared a Grade II Provincial Heritage Site (GN 1705, 1980). The discovery of diamonds near Hopetown and in Kimberley led in part to the conflicts of the First and Second Anglo Boer Wars. Significant events associated with the Second Anglo Boer War, or South African War, took place in the region.

Between October 1900 and February 1901, General de Wet invaded the Cape Colony (Anglo Boer War Museum, 2010). He was attacked on Blaauw Kop farm (approximately 28 km from the Slypsteen Project). He evaded capture and fled to Slypsteen[1] where he lost

[1]Historical references to Slypsteen assume 18th to early 19th century farm boundaries. The current farm is therefore only a portion of the original farm.

his guns (Waters 1904: 93). De Wet managed to break through the British lines on Du Toit's Draai from where he crossed the Orange River via the old railway bridge (Boshoff, 2006) and travelled along the river into the Free State (Waters, 1904: 93).

A strategy employed by the British during the war was to confine Boer women and children in concentration camps. One such camp, the Doornbult Concentration camp was established from 1901 to 1902 approximately 39 km south east from the project area (Wiid, 2011). Official British statistics stated that at least 250 people died there. In addition to this camp and cemetery, a British military camp was also established on Doornbult. This camp housed 16 000 British soldiers that would invade the Orange Free State.

The 1913 Douglas Reconnaissance map, an extract of which is depicted in Figure 8-4, was originally compiled in 1905 from sketches drawn by two British officers serving in the South African War. The information contained in this map is therefore particularly relevant to South African War history of the region (see Figure 8-5 for keys to map). At least two major wagon routes traversed the area, one of which is within the general project area. Also noteworthy are references to settlements and 'native kraals'. What is evident from this map is the extensive transport system that existed by 1913. The wagon road that extended from the project area crossed the Orange River outside Hopetown. This bridge comprised of a steel and earthen structure and a toll house. The site is a declared Provincial Heritage Site (GN 1349, 1990). There is also a blockhouse situated near the bridge.

An important observation is that the farm Slypsteen extended across the Orange River. References to certain events having taken place on Slypsteen are therefore problematic, as it could not be determined whether it included the current farm. A cursory review of the National Archives Automated Information Retrieval System (NAAIRS) database indicated that a primary school was located on Slypsteen farm between 1932 and 1941. This would mean that any existing infrastructure would be protected in terms of s. 34 of the NHRA. However, as indicated by the historical aerial imagery depicted in Figure 8-6, Figure 8-7 and Figure 8-8, no such infrastructure is visible, possibly indicating that the school is located on another portion. This was verified during the reconnaissance field survey conducted. These images also indicated the presence of pivot point irrigated fields in the project area that have since been rehabilitated. Associated agricultural activities in this area such as ploughing would have destroyed any surface and immediate subsurface archaeological deposit.

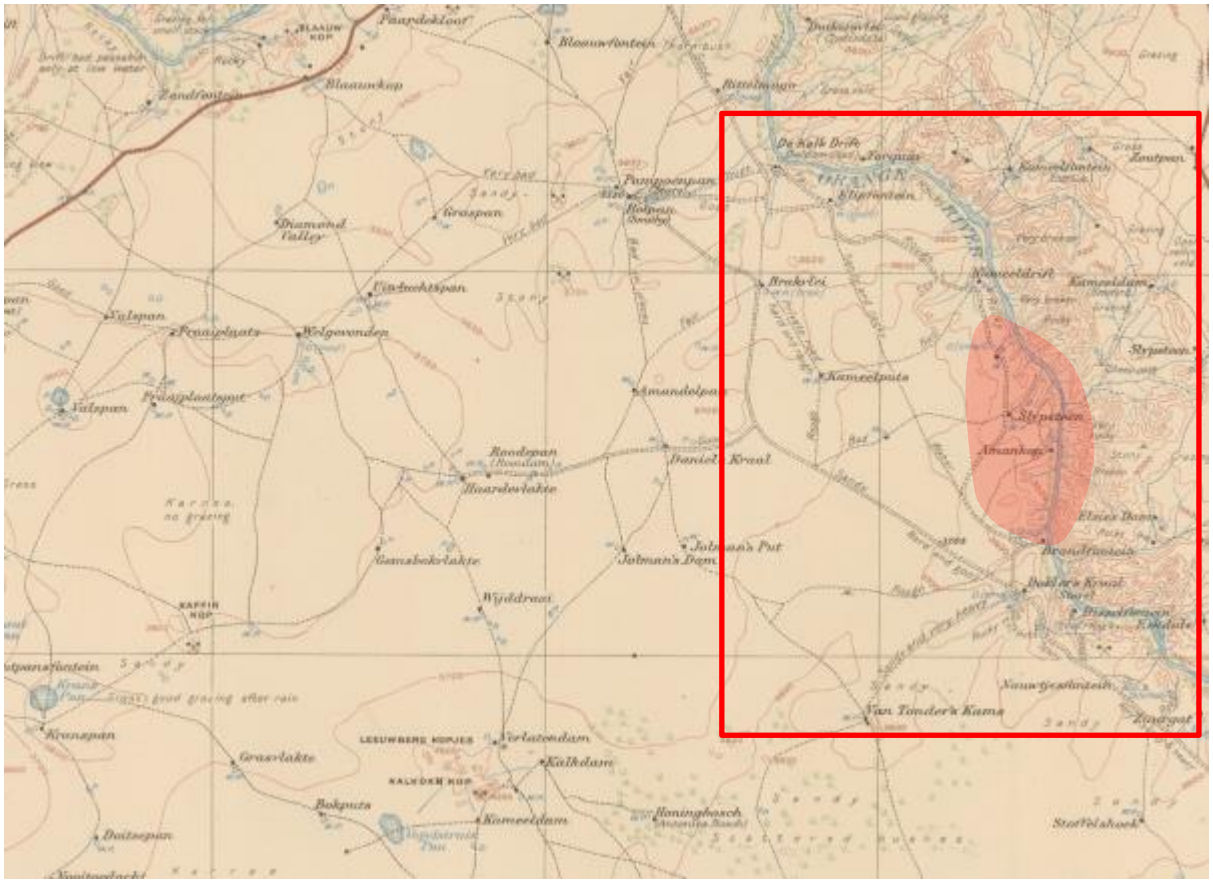


Figure 8-4: Douglas Reconnaissance map (1913) indicating the regional area of interest in red outline. The approximate Slypsteen Project location is shaded.

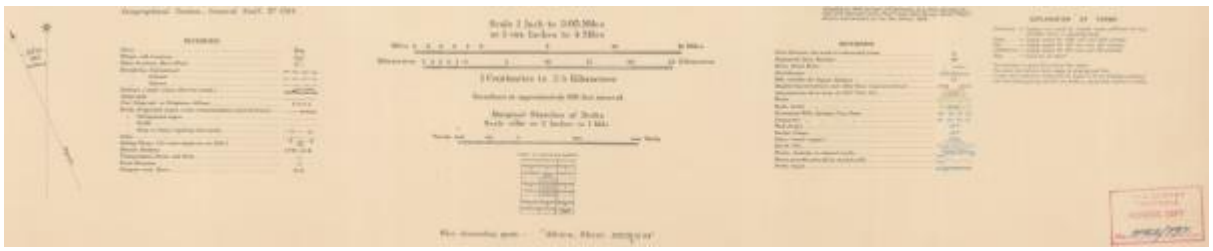


Figure 8-5: Map Key for Douglas Reconnaissance map (1913) above

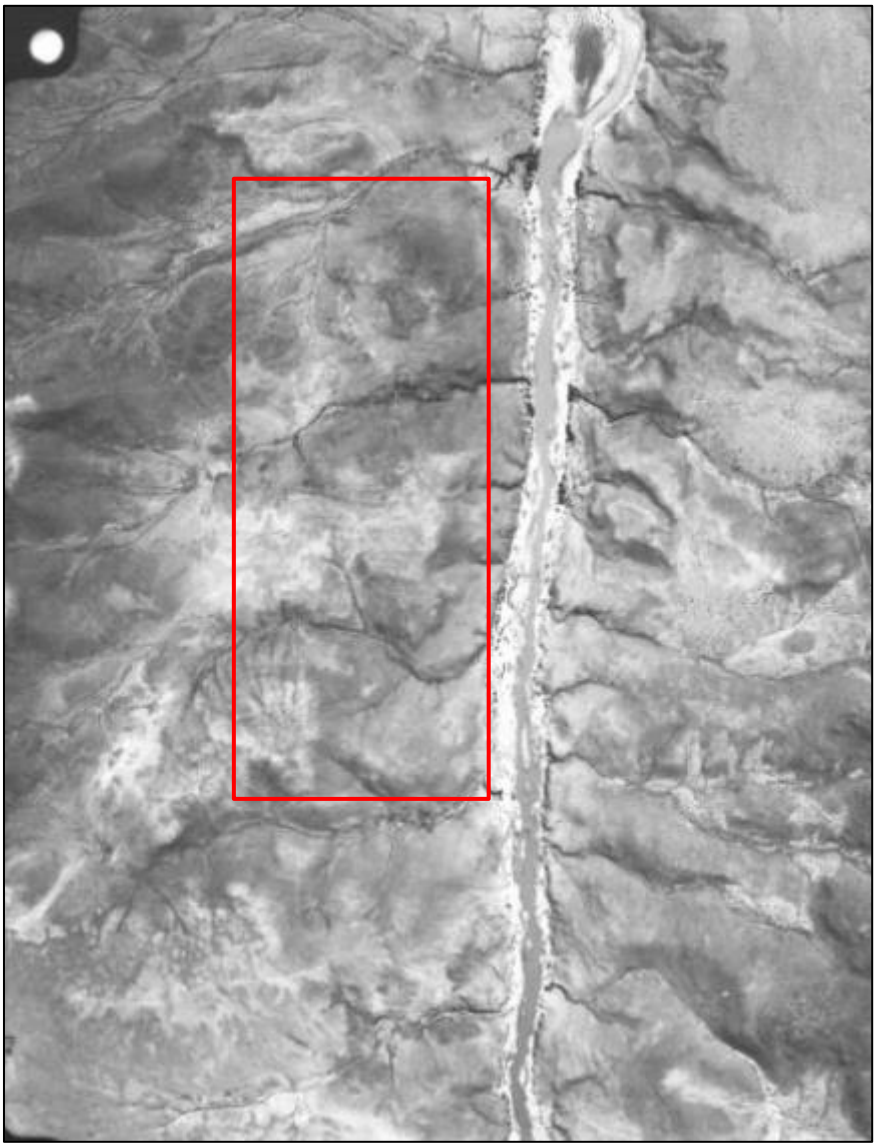


Figure 8-6: Historical aerial photograph of the Slypsteen project area in 1955 (351/1955)

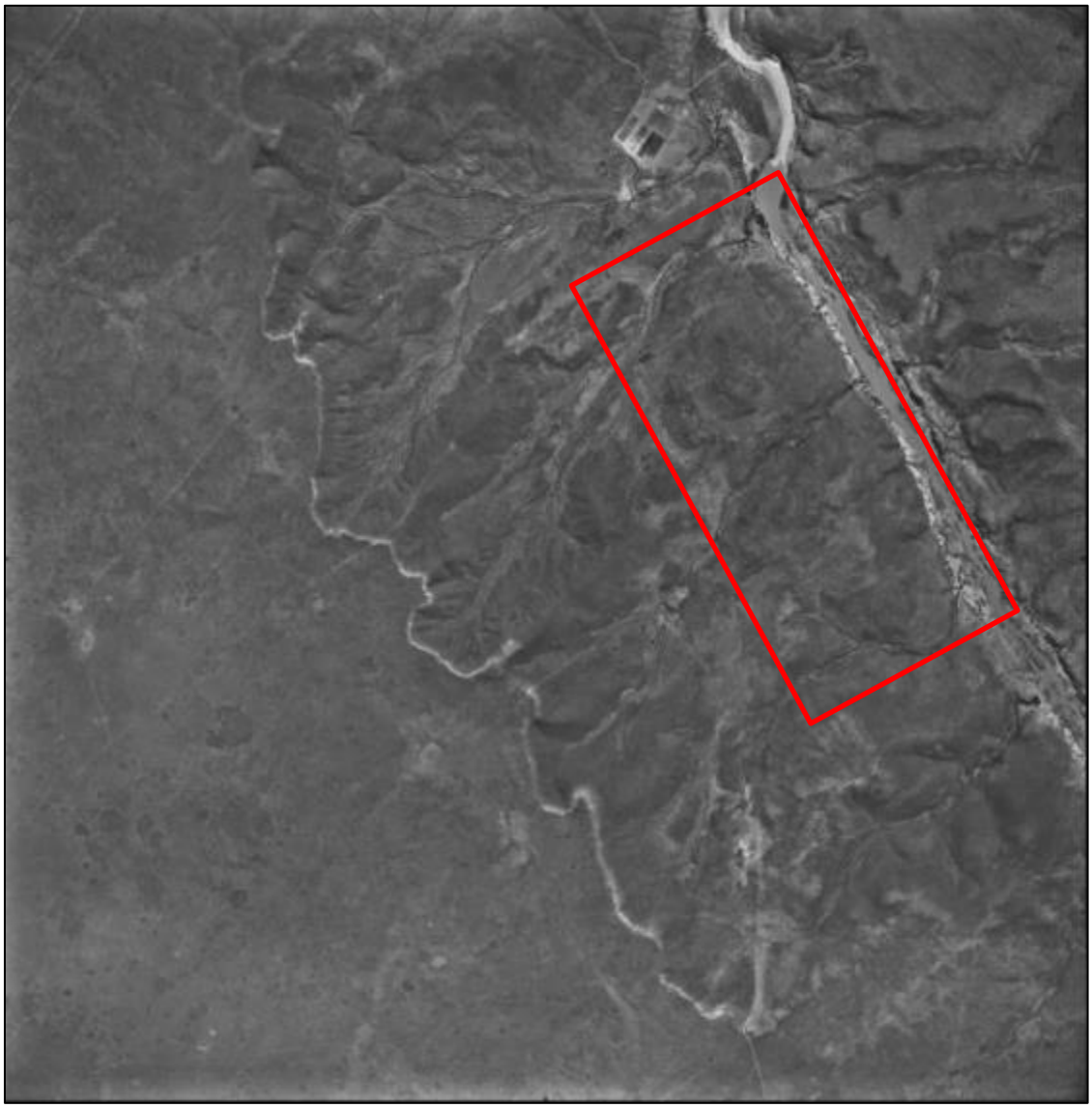


Figure 8-7: Historical aerial photograph of the Slypsteen project area in 1981 (498/173/1981)

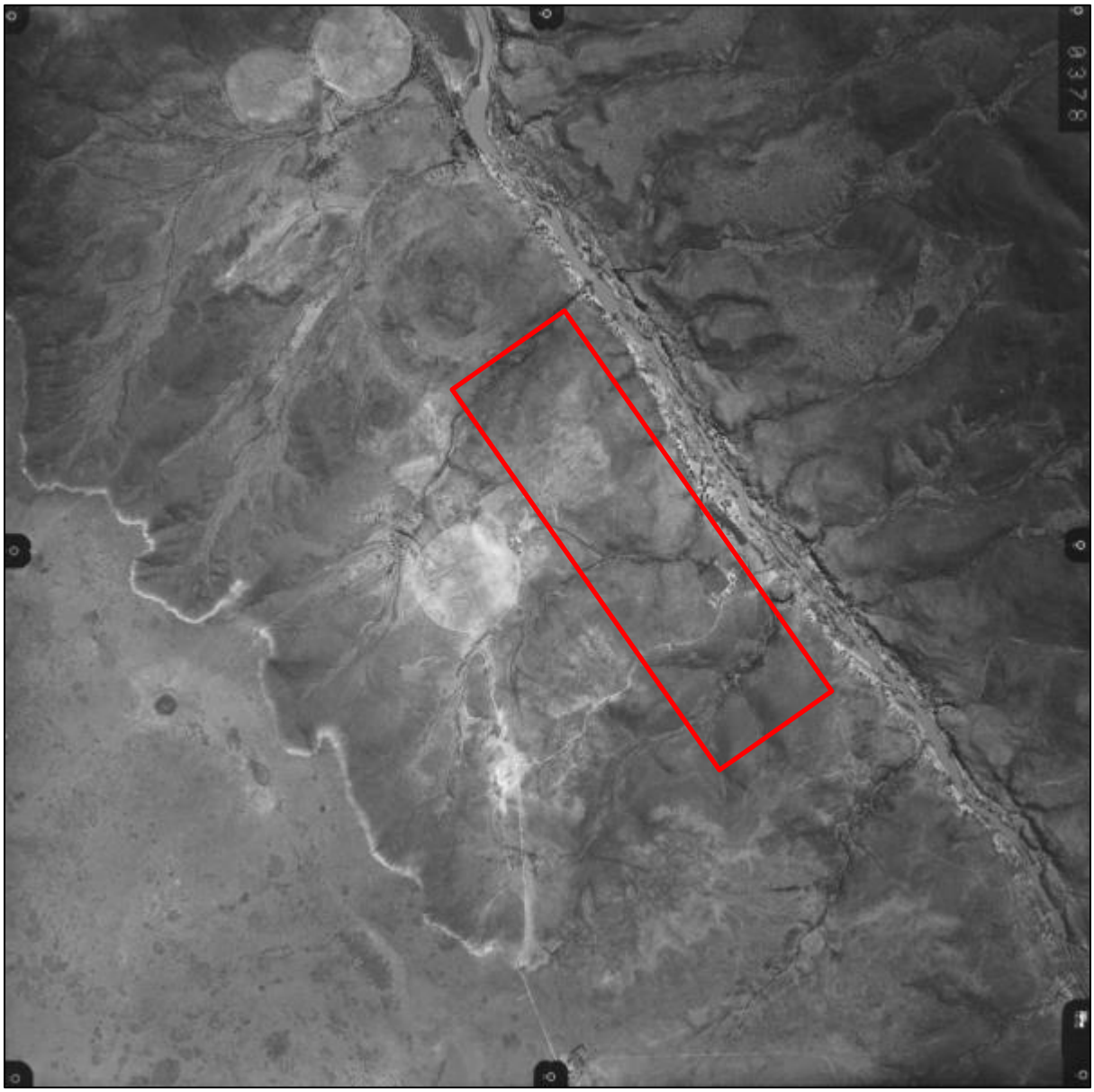


Figure 8-8: Historical aerial photograph of the Slypsteen project area in 1997 (1001/1997)

8.6 Summary of Discussion

Based on the above discussion, the following is a brief summary of the most important findings:

- The palaeontological potential of the project area is low, but there are high potential areas in the general region;
- Acheulean deposits in the Rietputs gravels are highly significant and can contribute to current and ongoing research;

- Surface ESA, MSA and LSA finds are relatively common place and typical of the general region;
- Notwithstanding the relative low significance of individual recorded sites, they represent combined evidence of a significant archaeological and historical cultural landscape that include inter alia:
  - A deep archaeological time depth spanning the past 1.6 million years;
  - A significant relic landscape associated with past and present San society; and
  - A landscape in which historically important events occurred and which can be associated with historic persona.

9 Statement of Significance / Heritage Value

The values assigned to identified sites are presented in **Error! Reference source not ound.**. Only those sites with a value above 'negligible' were considered in the impact assessment. Detailed site descriptions are provided in Appendix B.

Table 9-1: Summary of Statements of Significance for identified heritage resources

Resource ID	Description	Value	Designation	Recommended Mitigation
S.35-003	A single MSA blade	2	Negligible	Sufficiently recorded, no mitigation required
S.35-004	A single MSA flake	4	Negligible	Sufficiently recorded, no mitigation required
S.35-001	Acheulean ESA lithics	12	Medium	Mitigation of resource to include detailed recording and mapping, and limited sampling, e.g. STPs.
S.35-002	MSA / LSA Lithic scatter	12	Medium	Mitigation of resource to include detailed recording and mapping, and limited sampling, e.g. STPs.
S.35-005	Lithic scatter	12	Medium	Mitigation of resource to include detailed recording and mapping, and limited sampling, e.g. STPs.
S.35-006	Acheulean lithics	12	Medium	Mitigation of resource to include detailed recording and mapping, and limited sampling, e.g. STPs.
Archaeological landscape	The region in general is characterised as a significant archaeological landscape with deep time depth, including	16	High	Project design must aim to avoid change to resource; Partly conserved, CMP

	potential palaeontological resources		

10 Impact Assessment

The impact assessment was only completed for sites that where the Statement of Significance (see section 6.5 above) was evaluated as low or higher. The impact assessments below considered changes to:

- Archaeological resources with low Statement of Significance;
- Archaeological resources with medium Statement of Significance; and
- Changes to a highly significant archaeological and historical landscape.

The results of the impact assessment is summarised in Table 3-1.

Table 10-1: Summary of impact assessment

Code	Impact	Pre-mitigation:						Post-mitigation:					
		Duration	Extent	Intensity	Consequence	Probability	Significance	Duration	Extent	Intensity	Consequence	Probability	Significance
Neg_SoS	Destruction of Heritage Resources with Negligible Significance	Permanent	Very limited	Very low - negative	Slightly detrimental	Certain	Minor - negative	Immediate	Very limited	Very low - negative	Negligible	Certain	Negligible - negative
Med-SoS	Destruction of Heritage Resources with Medium Significance	Permanent	Local	Moderately high - negative	Highly detrimental	Certain	Moderate - negative	Permanent	National	Moderately high - positive	Highly beneficial	Likely	Moderate - positive
Hi-SoS	Change to archaeological & historical landscape	Project Life	Limited	Moderately high - negative	Moderately detrimental	Certain	Moderate - negative	Project Life	Very limited	Moderate - positive	Slightly beneficial	Likely	Minor - positive

10.1 Impact Assessment of Heritage Resources: Medium Significance

These sites included:

- Site s.35-001 – Acheulean ESA lithics recovered from abandoned mining pit;
- Site s.35-002 – MSA / LSA lithic scatter, density 8/25 m^2;
- Site s.35-005 – MSA / LSA lithic scatter, density 5/25 m^2; and
- Site s.35-006 - Acheulean ESA lithics recovered, five artefacts in approximate 400 m^2 area.

Table 10-2: Impact assessment on archaeological sites with medium Statement of Significance

IMPACT DESCRIPTION: Destruction of Heritage Resources with Medium Significance				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
Dimension	**Rating**	**Motivation**		
PRE-MITIGATION				
Duration	Permanent (7)	Proposed open pit mining of alluvial gravels will result in permanent loss of Stone Age artefacts	Consequence: Highly detrimental (-14)	Significance: Moderate - negative (-98)
Extent	Local (3)	Some site context may exist that will be lost during mining; Site may extend subsurface, but cannot be determined without mitigation.		
Intensity x type of impact	Moderately high - negative (-4)	Loss of site with a medium heritage value.		
Probability	Certain (7)	The site will be destroyed regardless of any mitigation measures.		
MITIGATION: - These resources will require detailed recording, inclusive of extensive site mapping and surface collection '- A watching brief by a suitably qualified archaeologist during construction and operation will enable additional information to be collected				
POST-MITIGATION				
Duration	Permanent (7)	As for pre-mitigation	Consequence: Highly beneficial (17)	Significance: Moderate - positive (85)
Extent	National (6)	As for pre-mitigation		
Intensity x type of impact	Moderately high - positive (4)	Mitigation will enable scientific data collection that will contribute to understanding of regional Stone Age		
Probability	Likely (5)	Mitigation is likely to contribute to research and result in scientific papers or theses		

10.2 Impact Assessment of Heritage Resource: High Significance

The general archaeological-historical landscape was considered as highly significant and sensitive to change.

Table 10-3: Impact assessment on highly significant archaeological and cultural landscape

IMPACT DESCRIPTION: Change to archaeological & historical landscape				
Predicted for project phase:	Pre-construction	Construction	Operation	Decommissioning
Dimension	**Rating**	**Motivation**		
PRE-MITIGATION				
Duration	Project Life (5)	The landscape will experience continual change throughout the operational lifespan of the proposed Slypsteen Project	Consequence: Moderately detrimental (-11)	Significance: Moderate - negative (-77)
Extent	Limited (2)	Change will be limited to specific heritage resources that may be exposed or identified during the operational life of the project.		
Intensity x type of impact	Moderately high - negative (-4)	The landscape itself was evaluated as highly significant; Changes to the landscape may result in even minor changes to highly valued heritage resources		
Probability	Certain (7)	Without appropriate mitigation and management changes to the landscape and heritage resources may result in negative impacts.		
MITIGATION: - Watching briefs need to be implemented during operation in areas where the likelihood of in situ archaeological deposit is high; - Outcrops of Ventersdorp Lava need to be avoided to reduce possible impact on potential rock art; - Mining operations need to be monitored to minimise potential impacts on tangible heritage; - Rehabilitation of mined areas to be done in a manner where sites will be returned to pre-mining conditions to reduce visual impacts and changes to the sense of place of the landscape;				
POST-MITIGATION				
Duration	Project Life (5)	As for pre-mitigation	Consequence: Slightly beneficial (9)	Significance: Minor - positive (45)
Extent	Very limited (1)	As for pre-mitigation		
Intensity x type of impact	Moderate - positive (3)	As for pre-mitigation		
Probability	Likely (5)	- Mitigation will reduce and/or avoid unnecessary destruction of tangible heritage; - A watching brief will enable identification of potential highly significant in situ archaeological deposit; - Negative changes / impacts on identified archaeological deposits will be reduced through systematic sampling and information collection; - Change to the cultural landscape can be monitored to ensure minimal negative changes; - Site rehabilitation will enable the landscape to return to a pre-mining state with regard to aesthetic aspects that contribute to the sense of place and landscape character.		

11 Recommendation for a Heritage Management Plan

Recommendations for appropriate Heritage Management Plan (HMP) were made considering the following:

- Statements of Significance;
- Identified sources of risk; and
- Impact assessment.

The recommended mitigation will reduce negative impacts on resources with medium and high significance, as indicated in the Table 11-1 below.

11.1 Generic HMP Recommendations

In general, project related mitigation measures such as avoiding resources that were recorded in or near proposed bulk sampling pits are unfeasible. The siting of these pits is dependent on the presence of alluvial diamondiferous gravels. However, the following HMP measures need to be included in the EMP:

- Bulk sampling must avoid as far as possible rocky outcrops and boulders, especially where these comprise Ventersdorp lavas, andesites and dolerites to prevent any risk to possible rock art;
- Where bulk sampling cannot be avoided in areas indicated above, a thorough survey of these areas will need to be done to identify any rock art that may exist;
- If rock art is identified, a HIA must be undertaken to determine appropriate mitigation of identified rock art;
- Periodic monitoring and inspection during construction and the operation life of the proposed Slypsteen bulk sample project needs to be undertaken to ensure the above measures are complied with.

11.2 Resources Specific HMP Recommendations

With regard to specific recorded heritage resources, the following HMP measures need to be implemented.

11.2.1 Resources with Negligible Statements of Significance

No mitigation will be required for recorded sites that were assigned negligible values. These included:

- Site s.35-003; and
- Site s.35-004.

This will result in a negligible negative impact.

11.2.2 Resources with Medium Statements of Significance

These sites included:

- Site s.35-001;
- Site s.35-002;
- Site s.35-005; and
- Site s.35-006.

As these sites are located in areas where alluvial gravels are expected, there is a likelihood of subsurface deposits existing, similar to those discussed by Leader (2009) and Gibbon et al (2009). Recommended mitigation for these resources must therefore aim to record the sites in sufficient detail to ensure, as a minimum, preservation by record. Mitigation should include the following actions:

- Detailed surface mapping and sampling to determine the extent and archaeological context of each site; and
- Due to the superficial nature (i.e. identified as surface scatters) of these sites, Shovel Test Pits are also recommended to determine whether any stratified deposit may be present;
- An archaeological watching brief is further recommended during construction and/or operation to ensure any Acheulean deposit is noted, recorded and fully documented.

Although these sites will ultimately be destroyed – either through archaeological excavations or mining – the potential to generate significant information and contribute to current research is high. To reduce loss of information and costs associated with the recommended mitigation, the above actions could take place concurrent with construction and mining, similar to the methodology adopted by Leader (2009).

Following this HMP will result in moderate, positive impacts post-mitigation.

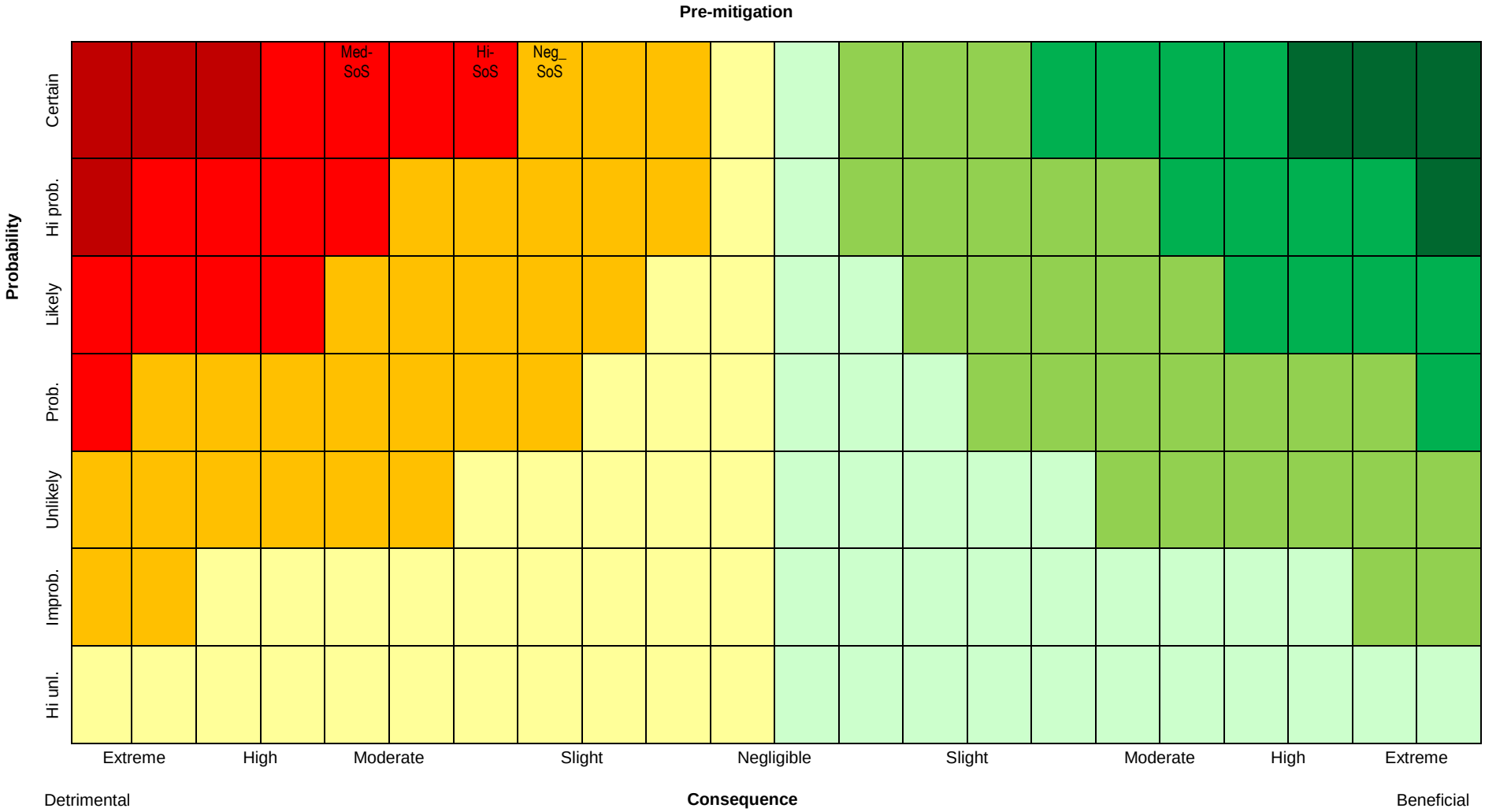
11.2.3 Resource with High Statements of Significance

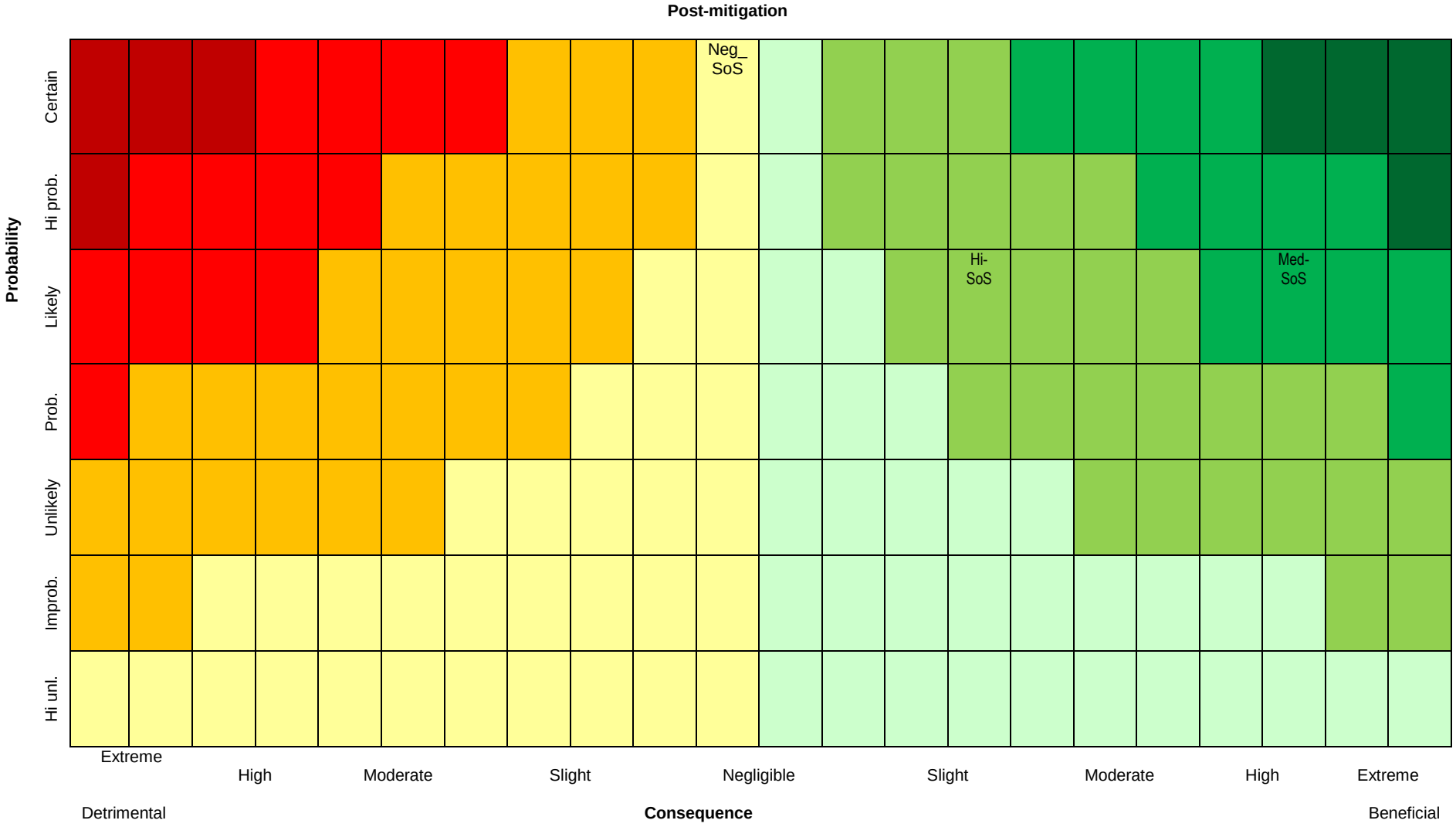
The archaeological-historical landscape was found to be a highly significant and potentially sensitive heritage resource. The proposed Slypsteen Project will have a relative low negative impact on this resource, provided the recommended mitigation measures discussed above are implemented. The following actions should ensure post-mitigation impacts reflect at least as minor, positive ratings:

- Implement watching briefs during construction and operation;
- Periodic monitoring of mining operation;
- Avoid potential rock art areas (cf. 11.1 above); and

Rehabilitation of mined areas to pre-mining conditions to reduce visual impacts and changes to sense of place.

Table 11-1: Chart indicating pre- and post-mitigation impact rankings




Post-mitigation
Probability
Certain
Hi prob.
Likely
Prob.
Unlikely
Improb.
Hi unl.
Neg_ SoS
Hi- SoS
Med- SoS
Extreme
High
Moderate
Slight
Negligible
Slight
Moderate
High
Extreme
Detrimental
Consequence
Beneficial

12 Conclusion

The proposed Slypsteen Project is located outside Hopetown in the Northern Cape Province. The project comprises a Prospecting Licence renewal and EMP for bulk sampling that will entail pick and shovel operations. This report presents the findings of an HIA undertaken in terms of s. 38(8) of the NHRA.

The socio-economic profile for the TLM / Hopetown area was found to be generally impoverished. Regional and local development plans are therefore aimed at reducing poverty through the implementation of diverse strategies that include inter alia increased mineral beneficiation, more intensified agriculture and tourism. These plans may pose cumulative risks to heritage resources such as archaeological and historical sites, some of which have been identified in this report.

Identified, recorded resources included in this report were primarily associated with the ESA, MSA and LSA ranged from negligible (two sites) to medium (four sites) significance. These sites were, however, found to represent only parts of a much wider and more meaningful archaeological and historical landscape. This landscape –as a heritage resource – was determined to be of high significance.

Issues associated with the proposed Slypsteen Project were assessed as minor and moderately negative impacts. These impacts, if properly mitigated through the implementation of the recommended HMP, will be reduced to minor and moderate positive impacts – specifically in terms of the possible contribution to current archaeological Stone Age research.

Based on the findings contained in this HIA report, Digby Wells therefore recommends that Statutory Comment required in terms of s. 38(8) of the NHRA approves the proposed Slypsteen Project provided that the recommended HMP is included and implemented in the bulk sampling EMP.

13 References

Anglo Boer War Museum. (2010). *General CR de Wet*. Retrieved February 27, 2014, from Anglo Boer War Museum: http://www.anglo-boer.co.za/role-players/gen-cr-de-wet.php

Boshoff, W. (2006). *Doornbult: Sites*. Retrieved February 27, 2014, from Doornbult: Anglo Boer War Historical and Archaeological Site: http://www.doornbult.com/sites_station.htm

Burchell, W. (1822). *Travels in the interior of southern Africa. Vol. 1.* London: Batchworth.

Campbell, J. (1815). *Travels in South Africa, undertaken at the request of the Missionary Society.* London: Black, Parry & Co.

Department of Environmental Affairs and Tourism, S. (2014). *The !Xam Khomani Heartland*. Retrieved March 19, 2014, from UNESCO: http://whc.unesco.org/en/tentativelists/1910/

Gibbon, R. J., Granger, D. E., Kuman, K., & Partridge, T. C. (2009). Early Acheulean technology in the Rietputs Formation, South Africa, dated with cosmogenic nuclides. *Journal of Human Evolution, 56*, 152-160.

Government Notice 1078, Government Gazette 4732 (June 6, 1975).

Government Notice 1349, Government Gazette 12540 (June 22, 1990).

Government Notice 1705, Government Gazette 7187 (August 22, 1980).

Government Notice 413, Government Gazette 15529 (March 4, 1994).

Government Notice 5184, Government Gazette 17457 (October 4, 1996).

Henderson, Z. (2002). A Dated Cache of Ostrich-Eggshell Flasks from Thomas' Farm, Northern Cape Province, SouthAfrica. *The South African Archaeological Bulletin, 57*(175), 38-40.

Humphreys, A. B. (1970). The Remains from Koffiefontein Burials Excavated by W. Fowler and Preserved in theMcGregor Museum, Kimberley. *The South African Archaeological Bulletin, 25*(99/100), 104-115.

Humphreys, A. B. (1982). Cultural Material from Burials on the Farm St. Clair, Douglas Area, Northern Cape. *The South African Archaeological Bulletin, 37*(136), 68-70.

Humphreys, A. J. (1974). A Preliminary Report on Test Excavations at Dikbosch Shelter I, Herbert District, Northern Cape. *The South African Archaeological Bulletin, 29*(115/116), 115-119.

Leader IV, G. M. (2009). *Early Acheulean in the Vaal River basin, Rietputs Formation, Northern Cape Province, South Africa (Unpublished Masters Thesis).* Johannesburg: University of the Witwatersrand.

Maggs, T. M. (1976). Iron Age Communities of the Southern Highveld. *Occasional Publication 2*. Pietermaritzburg: Natal Museum.

Mason, R. (1954). A Burial Site at Driekopseiland. *The South African Archaeological Bulletin, 9*(36), 134.

Morris, D. (1988). Engraved in Place and Time: A Review of Variability in the Rock Art of the Northern Capeand Karoo. *The South African Archaeological Bulletin, 43*(148), 109-120.

Morris, D. (2005). Further Evidence of Spouts on Ostrich Eggshell Containers from the Northern Cape, with a Note on the History of Anthropology and Archaeology at the McGregor Museum, Kimberley. *The South African Archaeological Bulletin, 60*(182), 112-114.

Morris, D. (2009). *A Further Phase 1 Archaeological Impact Assessment at Bucklands Settlement near Douglas, Northern Cape.* Kimberly: McGregor Museum.

Morris, D. (2009a). *Report on a Phase 1 Archaeological Impact Assessment at Bucklands Settlement near Douglas, Northern Cape (SAHRA Ref: 9/2/038/0001).* Kimberly: McGregor Museum.

Morris, D. (2009b). *Report on a further Phase 1 Archaeological Impact Assessment at Bucklands Settlement near Douglas, Northern Cape (SAHRA Ref: 9/2/038/0001).* Kimberly: McGregor Museum.

Mucina, L., & Rutherford, M. C. (2006). *The Vegetation of South Africa, Lesotho and Swaziland.* Pretoria: Strelitzia: South African National Biodiversity Institute.

Nel, L. (2005). *The Geological Evaluation of Diamondiferous Gravels on the farm Slypsteen 41.* Brandfort: Unknown.

Raper, R. E. (1987). *Dictionary of Southern African Place Name.* Johannesburg: Lowry Publishers.

Rossouw, L. (2013). *Phase 1 Palaeontological Impact Assessment of the Proposed Construction of the North and South Sidala Hydroelectric Power Sites on the Orange River, Siyancuma and Thembelihle municipalities, NC.* Langehovenpark: Palaeo Field Services .

SAHRIS. (2014). *Fossil Heritage Layer Browser*. Retrieved February 26, 2014, from The South African Heritage Resources Information System: http://www.sahra.org.za/fossil-heritage-layer-browser

SARADA. (2010). *South African Rock Art Digital Archive*. Retrieved February 26, 2014, from South African Rock Art Digital Archive: http://www.sarada.co.za/

Thembelihle Local Municipality. (2012). *Local Economic Development Strategy.* Thembelihle Local Municipality.

van Ryneveld, K. (2005). *Cultural Resources Management Impact Assessment: (Portions of) Ettrick 182; Hopetown District, Northern Cape, South Africa.(SAHRA Ref: 9/2/038/0001).* Kimberley: McGregor Museum.

van Ryneveld, K. (2013). *Phase 1 Archaeological Impact Assessment: The South Hydroelectric Power Site, Orange River, Thembilihle Local Municipality, Northern Cape, South Africa.* Beacon Bay: ArchaeoMaps Archaeological Consultancy.

van Ryneveld, K. (2013a). *Phase 1 Archaeological Impact Assessment: The North Hydroelectric Power Site, Orange River, Siyancuma Local Municipality, Northern Cape, South Africa (SAHRIS Case ID: 3264).* Beacon Bay: ArchaeoMaps Archaeological Consultancy.

van Ryneveld, K. (2013b). *Phase 1 Archaeological Impact Assessment: The South Hydroelectric Power Site, Orange River, Thembilihle Local Municipality, Northern Cape, South Africa (SAHRIS Case ID: 3266).* Beacon Bay: ArchaeoMaps Archaeological Consultancy.

Waters, W. H. (1904). *The War in South Africa.*

Wiid, R. (2011). *Ons mag nie vergeet nie: Doornbult-konsentrasiekamp 1901-1902.* Exclusive Solutions.

Appendix A: CV's of Specialists

NATASHA HIGGITT

Ms Natasha Higgitt

Assistant Heritage Consultant

Social Department

Digby Wells Environmental

1 EDUCATION

- University of Pretoria
- BA Degree (2008)
- Archaeology Honours (2010)
- Title of Dissertation- Pass the Salt: An Archaeological analysis of lithics and ceramics from Salt Pan Ledge, Soutpansberg, for evidence of salt working and interaction.

2 LANGUAGE SKILLS

- English - Excellent (read, write and speak)
- Afrikaans - Fair (read, write and speak)
- Italian – Poor (Speaking only)

3 EMPLOYMENT

- July 2011 to Present: Assistant Heritage Consultant at Digby Wells Environmental
- April 2011 to June 2011: Lab assistant at the Albany Museum Archaeology Department, Grahamstown, Eastern Cape
- April 2010 to March 2011: Intern at the Archaeology Department, Albany Museum, Grahamstown, Eastern Cape under the Department of Sports, Recreation, Arts and Culture, Eastern Cape Government, South Africa (DSRAC)

4 FIELD EXPERIENCE

- Human remains rescue excavation at St Francis Bay, Eastern Cape
- Human remains rescue excavation at Wolwefontein, Eastern Cape
- Recorded two rock art sites at Blaauwbosch Private Game Reserve, Eastern Cape

- Attended a 2 week excavation/study tour in the Friuli Region in Italy, organised by the *Società Friulana di Archeologia*, sponsored by *Ente Friuli nel Mondo*, and excavated a 12th century medieval castle
- Attended a 2 week excavation in Limpopo, Waterpoort Archaeological Project organised by Xander Antonites (Yale PhD Candidate)
- A total of 5 University of Pretoria Archaeology field schools in Limpopo and Gauteng spanning over 4 years

5 PROJECT EXPERIENCE

- Heritage Statement for a Proposed Acetylene Gas Production Facility, located near Witkopdorp, Daleside, south of Johannesburg, Gauteng Province for Erm Southern Africa (Pty) Ltd (Digby Wells Environmental)
- Heritage Impact Assessment for the Platreef Platinum Project, Mokopane, Limpopo for Platreef Resources (Digby Wells Environmental)
- Heritage Statement for ATCOM and Tweefontein Dragline Relocation Project, near Witbank, Mpumalanga Province for Jones and Wagner Consulting Civil Engineers (Digby Wells Environmental)
- Heritage Statement Report for the Wilgespruit Bridge Upgrade, Pretoria, Gauteng Province for Iliso Consulting (Pty) Ltd (Digby Wells Environmental)
- Heritage Statement Report for the Kosmosdal sewer pipe bridge upgrade, Pretoria, Gauteng Province for Iliso Consulting (Pty) Ltd (Digby Wells Environmental)
- Phase 1 Heritage Impact Assessment for the Thabametsi Coal Mine, Lephalale, Limpopo for Exxaro Coal (Digby Wells Environmental)
- Heritage Statement for the Zandbaken Coal Mine Project, Zandbaken 585 IR, Sandbaken 363 IR and Bosmans Spruit 364 IS, Standerton, Mpumalanga for Xtrata Coal South Africa (Digby Wells Environmental)
- Phase 1 Heritage Impact Assessment for the Brakfontein Thermal Coal Mine, Mpumalanga for Universal Coal (Digby Wells Environmental)
- Development of a RAP for Aureus Mining for the New Liberty Gold Mine Project, Liberia (Digby Wells Environmental)
- Phase 1 Archaeological Impact Assessment for the MBET Pipeline, Steenbokpan, Limpopo (Digby Wells Environmental)
- Notice of Intent to Develop and Cultural Resources Pre-Assessment for Orlight SA (PTY) Ltd Solar PV Project. 2012. (Digby Wells Environmental)
- Agricultural Survey for Platreef ESIA, Mokopane, Limpopo. 2011. (Digby Wells Environmental)

- Cultural Resources Pre-Assessment for the Proposed Sylvania Everest North Mining Development in Mpumalanga, near Lydenburg. 2011. (Digby Wells Environmental)
- Phase 2 Mitigation of Archaeological sites at Boikarabelo Coal Mine, Steenbokpan, Limpopo. 2011. (Digby Wells Environmental)
- Cultural Resources Pre-Assessment for Proposed Platinum Mine Prospecting in Mpumalanga, near Bethal for Anglo Platinum. 2011. (Digby Wells Environmental)
- Cultural Resources Pre-Assessment for proposed Platinum Mine at Mokopane, Limpopo for Ivanhoe Platinum. 2011. (Digby Wells Environmental)
- Phase 1 AIA Mixed-use housing Development, Kwanobuhle, Extension 11, Uitenhage, Eastern Cape. 2011.
- Phase 1 AIA Centane to Qholora and Kei River mouth road upgrade survey, Mnquma Municipality, Eastern Cape. 2011. (SRK Consulting)
- Phase 1 AIA Clidet Data Cable survey, Western Cape, Northern Cape, Free State and Eastern Cape. 2011. (SRK Consulting)
- Phase 1 AIA Karoo Renewable Energy Facility, Victoria West, Northern Cape. 2011. (Savannah Environmental)
- Phase 1 AIA Windfarm survey in Hamburg, Eastern Cape. 2010. (Savannah Environmental)
- Phase 1 AIA Windfarm survey in Molteno, Eastern Cape. 2010. (Savannah Environmental)
- Phase 1 AIA Housing Development at Motherwell, P.E. 2010. (SRK Consulting)
- Phase 1 AIA Sand quarry survey in Paterson, Eastern Cape. 2010. (SRK Consulting)
- Phase 1 AIA Quarry Survey at Victoria West. 2010. (Acer [Africa] Environmental Management Consultants)
- Phase 1 AIA Quarry Survey at Port Elizabeth. 2010. (E.P Brickfields)

6 PROFESSIONAL AFFILIATIONS

- Association of Southern African Professional Archaeologists (ASAPA): Professional member
- Association of Southern African Professional Archaeologists (ASAPA): CRM Practitioner (Field Supervisor: Stone Age, Iron Age and Rock Art)
- South African Museums Association (SAMA): Member

JOHAN NEL

Mr Johan Nel

Unit manager: Heritage Resources Management

Social Sciences

Digby Wells Environmental

1 EDUCATION

Date	Degree(s) or Diploma(s) obtained	Institution
2014	Integrated Heritage Resources Management Certificate, NQF Level 6	Rhodes University
2002	BA (Honours) (Archaeology)	University of Pretoria
2001	BA	University of Pretoria
1997	Matric with exemption	Brandwag Hoërskool

2 LANGUAGE SKILLS

Language	Speaking	Writing	Reading
English	Excellent	Excellent	Excellent
Afrikaans	Excellent	Excellent	Excellent

3 EMPLOYMENT

Period	Company	Title/position
09/2011 to present	Digby Wells Environmental	Manager: Heritage Resources Management unit
05/2010-2011	Digby Wells Environmental	Archaeologist
10/2005-05/2010	Archaic Heritage Project Management	Manager and co-owner
2003-2007		Freelance archaeologist
	Rock Art Mapping Project	Resident archaeologist

2002-2003	Department of Anatomy, University of Pretoria	Special assistant: Anthropology
2001-2002	Department of Anatomy, University of Pretoria	Technical assistant
1999-2001	National Cultural History Museum & Department of Anthropology and Archaeology, UP	Assistant: Mapungubwe Project,

4 EXPERIENCE

Johan Nel has 13 years of combined experience in the field of cultural heritage resources management (HRM) including archaeological and heritage assessments, grave relocation, social consultation and mitigation of archaeological sites. I have gained experience both within urban settings and remote rural landscapes. Since 2010 I have been actively involved in environmental management that has allowed me to investigate and implement the integration of heritage resources management into environmental impact assessments (EIA). Many of the projects since have required compliance with International Finance Corporation (IFC) requirements and other World Bank standards. This exposure has allowed me to develop and implement a HRM approach that is founded on international best practice and leading international conservation bodies such as UNESCO and ICOMOS. I have worked in most South African Provinces, as well as Swaziland, the Democratic Republic of the Congo, Liberia and Sierra Leone. I am fluent in English and Afrikaans, with excellent writing and research skills.

5 PROFESSIONAL REGISTRATION

Position	Professional Body	Registration Number
Council member	Association for Southern African Professional Archaeologists (ASAPA); ASAPA Cultural Resources Management (CRM) section	095
Member	International Association of Impact Assessors (IAIA)	N/A
Member	International Council on Monuments and Sites (ICOMOS)	
Member	Society for Africanist Archaeologists (SAfA)	N/A

6 PUBLICATIONS AND CONFERENCE PAPERS

Authors and Year	Title	Published in/presented at

Nel, J. (2001)	Cycles of Initiation in Traditional South African Cultures.	South African Encyclopaedia (MWEB).
Nel, J. 2001..	Social Consultation: Networking Human Remains and a Social Consultation Case Study	Research poster presentations at the. Bi-annual Conference (SA3) Association of Southern African Professional Archaeologists the National Museum, Cape Town
Nel, J. 2002.	Collections policy for the WG de Haas Anatomy museum and associated Collections.	Unpublished. Department of Anatomy, School of Medicine: University of Pretoria.
Nel, J. 2004..	Research and design of exhibition for Eloff Belting and Equipment CC	Institute of Quarrying 35th Conference and Exhibition on 24 – 27 March 2004
Nel, J. 2004.	Ritual and Symbolism in Archaeology, Does it exist?	Research paper presented at the Bi-annual Conference (SA3) Association of Southern African Professional Archaeologists: Kimberley
Nel, J & Tiley, S. 2004.	The Archaeology of Mapungubwe: a World Heritage Site in the Central Limpopo Valley, Republic of South Africa.	Archaeology World Report, (1) United Kingdom p.14-22.
Nel, J. 2007.	The Railway Code: Gautrain, NZASM and Heritage.	Public lecture for the South African Archaeological Society, Transvaal Branch: Roedean School, Parktown.
Nel, J. 2009.	Un-archaeologically speaking: the use, abuse and misuse of archaeology in popular culture.	The Digging Stick. April 2009. 26(1): 11-13: Johannesburg: The South African Archaeological Society.
Nel, J. 2011.	'Gods, Graves and Scholars' returning Mapungubwe human remains to their resting place.' In: Mapungubwe Remembered.	University of Pretoria commemorative publication: Johannesburg: Chris van Rensburg Publishers.
Nel, J. 2012	HIAs for EAPs.	. Paper presented at IAIA annual conference: Somerset West.

Nel, J. 2013.	The Matrix: A proposed method to evaluate significance of, and change to, heritage resources.	Paper presented at the 2013 ASAPA Biennial conference: Gaborone, Botswana.
Nel, J. 2013	HRM and EMS: Uncomfortable fit or separate process.	. Paper presented at the 2013 ASAPA Biennial conference: Gaborone, Botswana.

7 PROJECT EXPERIENCE

- 2003-2004. Freelance consulting archaeologist. Archaeological Impact Assessment. Roodt&Roodt. RSA. Limpopo, Mpumalanga, Northwest. Project manager/specialist
- 2004-2005. Resident archaeologist Rock Art Mapping Project. Archaeological surveys. UKZN. RSA. Didima, KZN. Specialist
- 2006. Exploratory excavation of an unknown cemetery at Du Preezhoek, Fountains Valley, Portion 383 of the farm Elandspoort 357 JR, Pretoria, Gauteng. Section 36 Grave relocation. Bombela Civil Joint Venture. RSA. Pretoria, Gauteng. Specialist
- 2006. Report on exhumation, relocation and re-internment of 49 graves on Portion 10 of the farm Tygervallei 334 JR, Kungwini Municipality, Gauteng. Section 36 Grave relocation. D. Georgiades East Farm (Pty) Ltd. RSA. Kungwini, Gauteng. Specialist
- 2006. Social consultation for Elawini Lifestyle Estate Grave Relocation. Section 36 Consultation. PGS (Pty) Ltd. RSA. Nelspruit, Mpumalanga. Project manager/specialist
- 2007-2008. Research report on the remains of kings Mampuru I and Nyabela. Research report. National Department of Arts and Culture. RSA. Graafwater, Western Cape. Specialist
- 2007. Summary report: Old dump on premises of the new Head Offices, Department of Foreign Affairs, Pretoria, Gauteng. Archaeological Impact Assessment. Imbumba-Aganang D & C Joint Venture. RSA. Pretoria, Gauteng. Project manager/specialist
- 2007. Final consolidated Heritage Impact Assessment report: Proposed development of high-cost housing and filling station, Portion of the farm Mooiplaats 147 JT. Heritage Impact Assessment. Go-Enviroscience. RSA. Schoemanskloof, Mpumalanga. Project manager/specialist
- 2007. Final consolidated report: Watching Brief on Soutpansberg Road Site for the new Head Offices of the Department of Foreign Affairs, Pretoria Gauteng. Section 35 Phase 2 Archaeological Mitigation. Imbumba-Aganang D & C Joint Venture. RSA. Pretoria, Gauteng. Project manager/specialist
- 2007. Recommendation of Exemption: Above ground SASOL fuel storage tanks located at grain silos in localities in the Eastern Free State. Request for Exemption. SASOL (Pty) Ltd. RSA. Eastern Free State. Project manager/specialist

- 2007. Final consolidated report: Phase 2 test excavations ascertaining the existence of alleged mass graves, Tlhabane West, Extension 2, Rustenburg, Northwest Province. Section 36 Test excavations. Bigen Africa Consulting Engineers. RSA. Rustenburg, Northwest. Project manager/specialist
- 2007. Archaeological investigation of Old Johannesburg Fort. Section 35 Phase 2 Archaeological Mitigation. JDA. RSA. Johannesburg, Gauteng. Project manager/specialist
- 2007. Social consultation for Motaganeng Residential Development Grave Relocation. Section 36 Consultation. PGS (Pty) Ltd. RSA. Burgersfort, Limpopo. Project manager/specialist
- 2007. Repatriation of Mapungubwe Human Remains. Repatriation. DEAT. RSA. Mapungubwe, Limpopo. Project manager/specialist
- 2007. Research report on cultural symbols. Research report. Ministery of Intelligence Services. RSA. Graafwater, Western Cape. Project manager/specialist
- 2008. Phase 1 Heritage and Archaeological Impact Assessment: Proposed establsihement of an access road between Sapekoe Drive and Koedoe Street, Erf 3366 (Extension 22) and the Remainder of Erf 430 (Extension 4). Archaeological Impact Assessment. AGES (Polokwane). RSA. Tzaneen, Limpopo. Specialist
- 2008. Heritage Impact Assessment for proposed water pipeline routes, Mogalakwena District, Limpopo Province. Heritage Statement. AGES (Polokwane). RSA. Mogalakwena District Municipality, Limpopo. Specialist
- 2008. Final report: Heritage resources Scoping survey and preliminary assessment for the Transnet Freight Line EIA, Eastern Cape and Northern Cape. Heritage Statement. Transnet. RSA. Eastern Cape; Northern Cape. Specialist
- 2008. Heritage resources scoping survey and preliminary assessment: Proposed establishment of township on Portion 28 of the farm Kennedy's Vale 362 KT, Steelpoort, Limpopo Province. Heritage Statement. AGES (Polokwane). RSA. Steelpoort, Limpopo. Specialist
- 2008. Report on skeletal material found at Pier 30, R21 Jones Street offramp, Kempton Park. Heritage Statement. Bombela Civil Joint Venture. RSA. Kempton Park, Gauteng. Specialist
- 2008. Social consultation for Smoky Hills Platinum Mine Grave Relocation. Section 36 Consultation. PGS (Pty) Ltd. RSA. Maandagshoek, Limpopo. Specialist
- 2008. Southstock Collieries Grave Relocation. Section 36 Grave relocation. Doves Funerals, Witbank. RSA. Southstock, Mpumalanga. Specialist
- 2008. Social consultation for Zondagskraal Coal Mine Grave Relocation. Section 36 Consultation. PGS (Pty) Ltd. RSA. Zondagskraal, Mpumalanga. Specialist

- 2009. Proposed road upgrade of existing, and construction of newroads in Burgersfort, Limpopo Province. Archaeological Impact Assessment. AGES (Polokwane). RSA. Burgersfort, Limpopo. Specialist
- 2009. Randwater Vlakfontein-Mamelodi water pipeline survey. Heritage Impact Assessment. Archaeology Africa cc. RSA. Pretoria, Gauteng. Specialist
- 2009. Van Reenen Eco-Agri Development Project. Heritage Impact Assessment. Go-Enviroscience. RSA. Vanreenen, Freestate/KwaZulu-Natal. Specialist
- 2009. Social consultation for Zonkezizwe Grave Relocation. Section 36 Consultation. PGS (Pty) Ltd. RSA. Midrand, Gauteng. Specialist
- 2009. Heritage Impact Assessment for conversion of PR to MRA. Heritage Impact Assessment. Georock Environmental. RSA. Musina, Limpopo. Specialist
- 2010-2012. Kibali Gold Mine Grave Relocation. International grave relocation project. Randgold Resources. DRC. Watsa, Province Orientale. Specialist
- 2010. Archaeological Impact Assessment for Galaxy Gold Mine Tailings Dam Extension, Barberton, Mpumalanga Province. Archaeological Impact Assessment. Galaxy Gold. RSA. Barberton, Mpumalanga. Specialist
- 2010. Archaeological Impact Assessment for the HCI Khusela Coal: Palesa Extension ESIA Update on portions of the farm Roodepoort 349 JR, Thembisile Local Municipality (Mpumalanga) and Kungwini Municipality (Gauteng). Archaeological Impact Assessment. HCI Khusela. RSA. Mpumalanga; Gauteng. Specialist
- 2010. Heritage scoping survey for the amendment of the existing City Deep EMP for the reclamation of Slimes Dam 3/L/42 and 3/L/40. Heritage Statement. Crown Gold Recoveries. RSA. Johannesburg, Gauteng. Specialist
- 2010. Letter of Recommendation of Exemption for the proposed Crown Gold Recoveries (Pty) Litd Pipeline Project. Request for Exemption. Crown Gold Recoveries. RSA. Johannesburg, Gauteng. Specialist
- 2010. Mitigation of an archaeological metalworking site for Kibali Gold Mine. Archaeological mitigation. Randgold Resources. DRC. Watsa, Province Orientale. Specialist
- 2010. Heritage Impact Assessment for Nzoro Hydropower Station. Heritage Impact Assessment. Randgold Resources. DRC. Watsa, Province Orientale. Specialist
- 2010. Heritage Impact Assessment for Temo Coal EIA. Heritage Impact Assessment. Temo Coal. RSA. Steenbokpan, Limpopo. Specialist
- 2011-2012. Platreef Platinum Mine Burial Grounds and Graves Census. Burial Grounds and Graves Census. Platreef (Pty) Ltd. RSA. Mokopane, Limpopo. Project manager/specialist
- 2011. Addendum to Phase 1 Archaeological Impact Assessment for the Boikarabelo Coal Mine (proposed railway link from the farm Kruishout to the farm Buffelsjagt). Archaeological Impact Assessment. Resources Generation. RSA. Lephalale, Limpopo. Project manager/specialist

- 2011. Heritage Impact Assesment for Koidu Diamond Mine. Heritage Impact Assessment. Koidu . Sierra Leone. Koidu, . Project manager/specialist
- 2011. Mitigation of an archaeological metalworking site for Koidu Diamond Mine. Archaeological mitigation. Koidu . Sierra Leone. Koidu, . Project manager/specialist
- 2011. Nzoro hydropower station ESIA. Heritage Impact Assessment. Randgold Resources. DRC. Watsa, Province Orientale. Project manager/specialist
- 2011. Specialist review of Heritage Impact Assessment report for Zod Gold Mine, Armenia. Review report. Zod Gold Mine. Armenia. Desktop review. Project manager/specialist
- 2012. Phase 1 Archaeological Impact Assessment for MBET Pipeline. Archaeological Impact Assessment. Resources Generation. RSA. Lephalale, Limpopo. Project manager/specialist
- 2012. Heritage Impact Assessment for the Witwatersrand Goldfields Acid Mine Drainage Project (Western Basin). Heritage Impact Assessment. BKS (PTY) LTD. RSA. Johannesburg, Gauteng. Project manager/specialist
- 2012. Phase 1 Heritage Impact Assessment of the proposed Geluksdal Tailings Storage Facility and Pipeline Infrastructure. Heritage Impact Assessment. Gold One. RSA. Johannesburg, Gauteng. Project manager/specialist
- 2012. Heritage Statement for the Central Basin, Witwatersrand AMD Project. Heritage Statement. BKS (PTY) LTD. RSA. Johannesburg, Gauteng. Project manager/specialist
- 2012. Heritage Statement for Rhodium Reefs Ltd Platinum Operation, 2430CA & CC, De Goedeverwachting 332 KT; Boschkloof 331 KT; Belvedere 362 KT; Kennedy's Vale 361 KT; and Tweefontein 360 KT, Limpopo. Heritage Statement. Eastplats Group. RSA. Steelpoort, Limpopo. Project manager/specialist
- 2012. Notification of Intent to Develop: Proposed Aggeneys Photo-voltaic soal power plant on Portion 1 of the farm Aroams 57 RD, Northern Cape (DEA ref: 12/12/20/2630). Heritage Statement. Orlight Solar. RSA. Aggeneys, Northern Cape. Specialist
- 2012. Notification of Intent to Develop: Proposed Kenhardt Photo-voltaic soal power plant on RE of the farm Klein Zwartbast 188 RD, Northern Cape (DEA ref: 12/12/20/2631). Heritage Statement. Orlight Solar. RSA. Kenhardt, Northern Cape. Project manager/specialist
- 2012. Notification of Intent to Develop: Proposed Loeriesfontein Photo-voltaic soal power plant on Portion 1 of the farm Klein Rooiberg 227 RD, Northern Cape (DEA ref: 12/12/20/2632). Heritage Statement. Orlight Solar. RSA. Loeriesfontein, Northern Cape. Specialist
- 2012. Notification of Intent to Develop: Proposed Vanrhynsdorp Photo-voltaic soal power plant on RE of the farm Paddock 257 RD, Western Cape (DEA ref: 12/12/20/2633). Heritage Statement. Orlight Solar. RSA. Vanrhynsdorp, Western Cape. Project manager/specialist
- 2012. Notification of Intent to Develop: Proposed Graafwater Photo-voltaic soal power plant on Portion 1 of the farm Graafwater 97 RD amd RE of Bueroskraal 220 RD, Western Cape

(DEA ref: 12/12/20/2636). Heritage Statement. Orlight Solar. RSA. Graafwater, Western Cape. Specialist

- 2012. Phase 2 archaeological impact assessment mitigation for Boikarabelo Coal Mine (SAHRA Permit No: 80/11/07/015/51). . Section 35 Phase 2 Archaeological Mitigation. Resources Generation. RSA. Steenbokpan, Limpopo. Project manager/specialist
- 2012. Final Phase 2 archaeological impact assessment mitigation report for Boikarabelo Coal Mine, Limpopo (SAHRA Permit No: 80/11/07/015/51). . Section 35 Phase 2 Archaeological Mitigation. Resources Generation. RSA. Steenbokpan, Limpopo. Specialist
- 2012. Holder of Destruction Permit No. 84 for archaeological sites at Boikarabelo Coal Mine. Section 35 Destruction permit. Resources Generation. RSA. Steenbokpan, Limpopo. Project manager/specialist
- 2012. Specialist review of Heritage Impact Assessment report for Mkuju Uraniam Mine. Review report. Uranex . Zambia. Desktop review. Project manager/specialist
- 2013. Heritage Impact Assessment for the proposed Consbrey Colliery Project, 2629BB and 2629BD, Mpumalanga Province. Heritage Impact Assessment. Msobo Coal. RSA. Breyten, Mpumalanga. Project manager/specialist
- 2013. Heritage Impact Assessment for Rhodium Reef Limited Platinum Operation, 2430CC Kennedys Vale, De Goedeverwachting 332 KT, Limpopo Province. Heritage Impact Assessment. Rhodium Reefs Limited. RSA. Steelpoort, Limpopo. Project manager/specialist
- 2013. Heritage Statement for the Consbrey Colliery. Heritage Statement. Msobo Coal. RSA. Chrissiesmeer, Mpumalanga. Project manager/specialist
- 2013. Heritage Statement for the Harwar Colliery. Heritage Statement. Msobo Coal. RSA. Chrissiesmeer, Mpumalanga. Project manager/specialist
- 2013. Heritage Statement for the Waterberg Prospecting Rights Application, Blouberg, Limpopo Province. Heritage Statement. Platinum Group Metals Ltd. RSA. Breyten, Mpumalanga. Specialist
- 2013. Destruction Permit Application Report for Kangala Coal Project. Section 34 Built Environment Permit. Universal Coal (Pty) Ltd. RSA. Delmas, Mpumalanga. Specialist
- 2013. Holder of Destruction Permit No. 399 for archaeological sites at Boikarabelo Coal Mine. Section 35 Destruction permit. Resources Generation. RSA. Steenbokpan, Limpopo. Project manager/specialist
- 2013. Relocation of graves in Kinjor and Larjor for Aureus New Liberty Gold Mine. International grave relocation project. Aureus Mining. Liberia. Kinjor. Specialist
- 2013. New Liberty Gold Mine Grave Relocation Plan. International grave relocation project. Aureus Mining. Liberia. Kinjor. Project manager/specialist
- 2013. Thabametsi Coal Mine Burial Grounds and Graves Census. Burial Grounds and Graves Census. Exxaro Coal. RSA. Lephalale, Limpopo. Specialist

- 2013. Bokoni Platinum Mine Burial Grounds and Graves Census. Burial Grounds and Graves Census. Bokoni Platinum. RSA. Atok, Limpopo. Specialist
- 2013. Specialist review of Heritage Impacts Assessment for Songwe REE project. Review report. Mkango Resources. Malawi. Desktop review. Project manager/specialist
- 2013: Heritage Impact Assessment for the Platreef Platinum Mine EIA project. Platreef Resources. RSA. Mokopane, Limpopo. Specialist project manager.

Appendix B: Detailed site descriptions

1.1 Site / resource descriptions

The reconnaissance survey identified, recorded and documents a total of six physical resources or sites, all associated with the Stone Age.

The archaeological-historical landscape was considered as an additional, intangible resource.

2 CASEID/MAP/S.35-001

Resources ID	s.35-001	
Location		
Description	Acheulean ESA lithics recovered from an abandoned mining pit excavated in in alluvial gravels. Five samples retrieved, including: Weathered handaxe core manufactured from large river pebble; Retouched flakes; Prepared discoid core.	
Statement of Significance		**Medium**
Aspect	**Value**	**Motivation**
Aesthetic (0-5, -)	-	Significance not assessed in terms of aesthetic value
Historic (0-5,-)	-	Significance not assessed in terms of historic value
Scientific (0-5, -)	3	Although the identified artefact types are relatively common finds throughout the region, the in situ context of this site with regard to the alluvial river gravels was considered significant. Due to the general subsurface nature of sites such as this, identification is usually not possible without archaeological excavations. The site was therefore considered important in terms of its information potential.
Social (0-5,-)	-	Significance not assessed in terms of social value
Integrity (0-4)	4	The integrity of the site and artefacts were determined to be high – although the site was exposed through mining operations the potential of further in situ material existing is high.

Photographic records

Figure 1: Lithics recovered from abandoned open mining pit, site s.35-003 – ventral view

Figure 2: Lithics recovered from abandoned open mining pit, site s.35-003 – ventral dorsal

3 CASEID/MAP/S.35-002

Resources ID	s.35-002	
Location		
Description	MSA / LSA Lithic scatter identified on the surface within a proposed bulk sample pit area. The site is located immediately above a dry drainage channel. Artefact density was approximately 8/25 m^2. Identified lithics included mainly flakes with retouched edges.	
Statement of Significance		**Medium**
Aspect	**Value**	**Motivation**
Aesthetic (0-5, -)	-	Significance not assessed in terms of aesthetic value
Historic (0-5,-)	-	Significance not assessed in terms of historic value
Scientific (0-5, -)	3	This site represents an example of resources commonly found throughout the region that would have lowered the site value. The possibility however of the site extending into the gravel layers is relatively good, considering the evidence obtained at site s.35-001. The scientific value was therefore considered high as the potential for a stratified deposit exists. The site was therefore considered important in terms of its information potential.
Social (0-5,-)	-	Significance not assessed in terms of social value
Integrity (0-4)	4	The integrity of the site and artefacts were determined to be high – although expressed as surface scatters and exhibiting a relative low artefact density. This assessment may require amendment pending evidence / absence of subsurface, in situ deposit.
Photographic records		

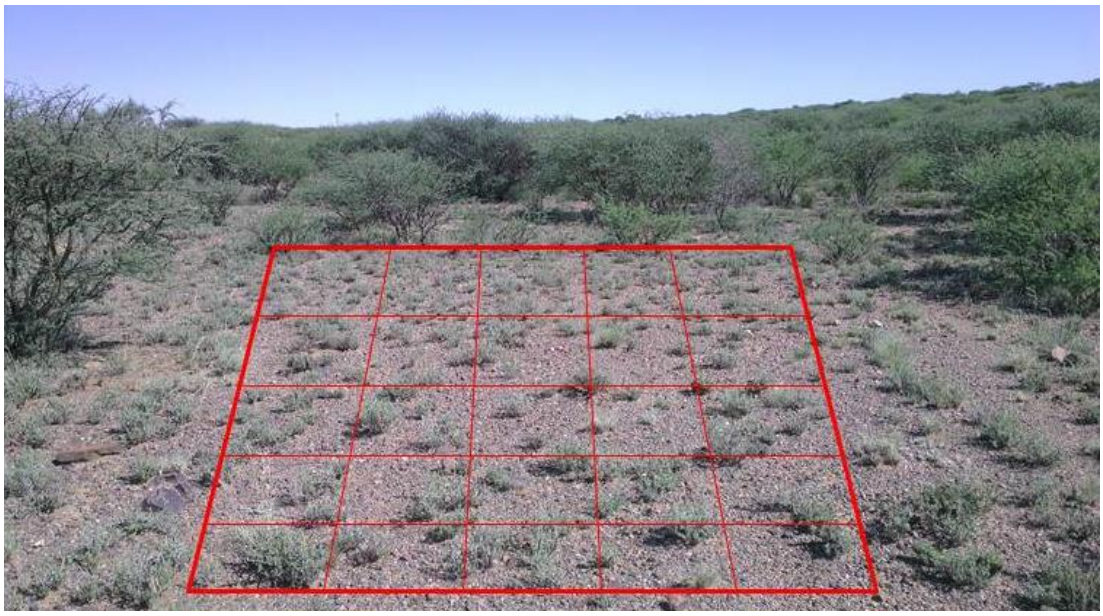


Figure 3: General view of site s.35-002. The red square indicates the approximate 5 m x 5 m sample area from where six artefacts where recovered.

Figure 4: Lithics recovered from 25 m^2 sample area at site s.35-002. Top depicts dorsal view and bottom ventral.

4 CASEID/MAP/S.35-003

Resources ID	s.35-003	
Location		
Description	A single MSA blade was found on the surface above a dry drainage line. No other artefacts were noted, nor any evidence of source material.	
Statement of Significance		**Negligible**
Aspect	**Value**	**Motivation**
Aesthetic (0-5, -)	-	Significance not assessed in terms of aesthetic value
Historic (0-5,-)	-	Significance not assessed in terms of historic value
Scientific (0-5, -)	1	The identified artefacts are representative of extremely common resources found throughout the region. In addition, no site context was noted. Given the presence of sites with higher potential information potential in the project area, this site was therefore determined to be of negligible significance.
Social (0-5,-)	-	Significance not assessed in terms of social value
Integrity (0-4)	2	Although the physical fabric of the resource displayed nearly pristine, the lack of context and information potential was such that the integrity was rated as low.
Photographic records		
Figure 5: Detail of site s.35-003 lithic. Top depicts dorsal view and bottom ventral view.		

5 CASEID/MAP/S.35-004

Resources ID	s.35-004	
Location		
Description	A single MSA flake was found on the surface. No other artefacts were noted, nor any evidence of source material.	
Statement of Significance		**Negligible**
Aspect	**Value**	**Motivation**
Aesthetic (0-5, -)	-	Significance not assessed in terms of aesthetic value
Historic (0-5,-)	-	Significance not assessed in terms of historic value
Scientific (0-5, -)	1	The identified artefacts are representative of extremely common resources found throughout the region. In addition, no site context was noted. Given the presence of sites with higher potential information potential in the project area, this site was therefore determined to be of negligible significance.
Social (0-5,-)	-	Significance not assessed in terms of social value
Integrity (0-4)	2	Although the physical fabric of the resource displayed nearly pristine, the lack of context and information potential was such that the integrity was rated as low.
Photographic records		

Figure 6: Detail of site s.35-004 lithic. Top depicts dorsal view and bottom ventral view.

6 CASEID/MAP/S.35-005

Resources ID	s.35-005	
Location		
Description	Lithic scatter identified on the surface within a proposed bulk sample pit area. The site is located immediately above a dry drainage channel. Artefact density was approximately 5/25 m^2. Identified lithics included mainly flakes with retouched edges.	
Statement of Significance		**Medium**
Aspect	**Value**	**Motivation**
Aesthetic (0-5, -)	-	Significance not assessed in terms of aesthetic value
Historic (0-5,-)	-	Significance not assessed in terms of historic value
Scientific (0-5, -)	3	This site represents an example of resources commonly found throughout the region, that would have lowered the site value. The possibility however of the site extending into the gravel layers is relatively good, considering the evidence obtained at site s.35-001. The scientific value was therefore considered high as the potential for a stratified deposit exists. The site was therefore considered important in terms of its information potential.
Social (0-5,-)	-	Significance not assessed in terms of social value
Integrity (0-4)	4	The integrity of the site and artefacts were determined to be high – although expressed as surface scatters and exhibiting a relative low artefact density. This assessment may require amendment pending evidence / absence of subsurface, in situ deposit.
Photographic records		

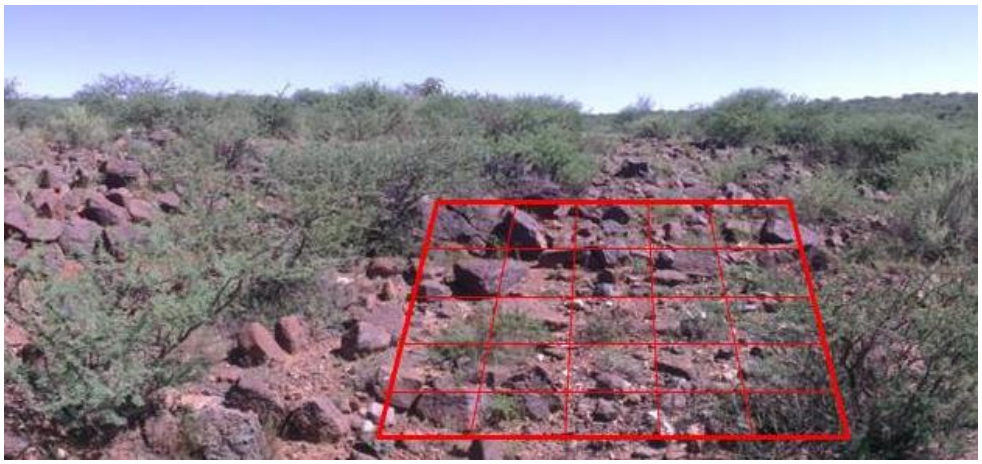


Figure 7: General view of site s.35-002. The red square indicates the approximate 5 m x 5 m sample area from where six artefacts where recovered.

Figure 8: Lithics recovered from 25 m^2 sample area at site s.35-005. Top depicts dorsal view and bottom ventral.

7 CASEID/MAP/S.35-006

Resources ID	s.35-006	
Location		
Description	Acheullian lithics identified on the surface within a proposed bulk sample pit area. Five artefacts were recovered from an area of approximately 400 m^2.	
Statement of Significance		**Medium**
Aspect	**Value**	**Motivation**
Aesthetic (0-5, -)	-	Significance not assessed in terms of aesthetic value
Historic (0-5,-)	-	Significance not assessed in terms of historic value
Scientific (0-5, -)	3	This site represents an example of resources commonly found throughout the region, that would have lowered the site value. The possibility however of the site extending into the gravel layers is relatively good, considering the evidence obtained at site s.35-001. The scientific value was therefore considered high as the potential for a stratified deposit exists. The site was therefore considered important in terms of its information potential.
Social (0-5,-)	-	Significance not assessed in terms of social value
Integrity (0-4)	4	The integrity of the site and artefacts were determined to be high – although expressed as surface scatters and exhibiting a relative low artefact density. This assessment may require amendment pending evidence / absence of subsurface, in situ deposit.
Photographic records		

Figure 9: Panaroma view of site s.35-006. The of the approximate 20 m x 20 m site area where six artefacts where recovered.

Figure 10: More detailed view of site s.35-006.

Figure 11: Lithics recovered from approximate 400 m^2 area at site s.35-006. Top depicts dorsal view and bottom ventral.

8 CASEID/MAP/ARCHAEOLOGICAL-HISTORICAL LANDSCAPE

Resources ID	Archaeological-historical landscape	
Location		
Description	A significant archaeological landscape with deep time depth, including potential palaeontological environment. The archaeological aspects merges into the historical landscape with the !Xam ǂKhomani 'heartland'. Significant South African War events and persona are associated with the landscape, including the first discovery of diamonds.	
Statement of Significance		**High**
Aspect	**Value**	**Motivation**
Aesthetic (0-5, -)	4	The aesthetic value was determined to be rare and of national importance based on the general sense of place, potential for rock art to exist as creative and aesthetic expressions, and historic architecture in the general region.
Historic (0-5,-)	4	The evidence for a deep time depth encapsulating palaeontology, archaeology and historic important events were consider to be uncommon and of national importance. The !Xam ǂKhomani heartland lends further authenticity to the landscape and increases it importance as a UNESCO Tentative List
Scientific (0-5, -)	4	Research potential in terms of Acheulean ESA sites is evident and can contribute to current knowledge base.
Social (0-5,-)	4	Social associations are evident, especially in terms of the !Xam San and descendants of early European settlers.
Integrity (0-4)	4	The general integrity of the landscape is intact.

Appendix C: Plans

Plan 1: Regional setting of the Slypsteen Project, 1: 250 000

Plan 2: Local setting of the Slypsteen Project, 1: 50 000

Plan 3: Potential bulk sample area of the Slypsteen Project, 1: 10 000

Plan 4: Geology of the Slypsteen Project

Plan 5: GPS track log and identified Heritage sites within the Slypsteen Project area

Plan 1

Sumer Seasons Trading (Pty) Ltd

Regional Setting
1: 250 000

Legend

Application Area

2922 Prieska

DIGBY WELLS ENVIRONMENTAL

• Sustainability • Service • Positive Change • Professionalism • Future Focused • Integrity

Projection: Transverse Mercator
Datum: WGS84

Ref #: sdp.SUM2604.201403.059
Revision Number: 1
Date: 13/03/2014

N

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Kilometres

1:900 000

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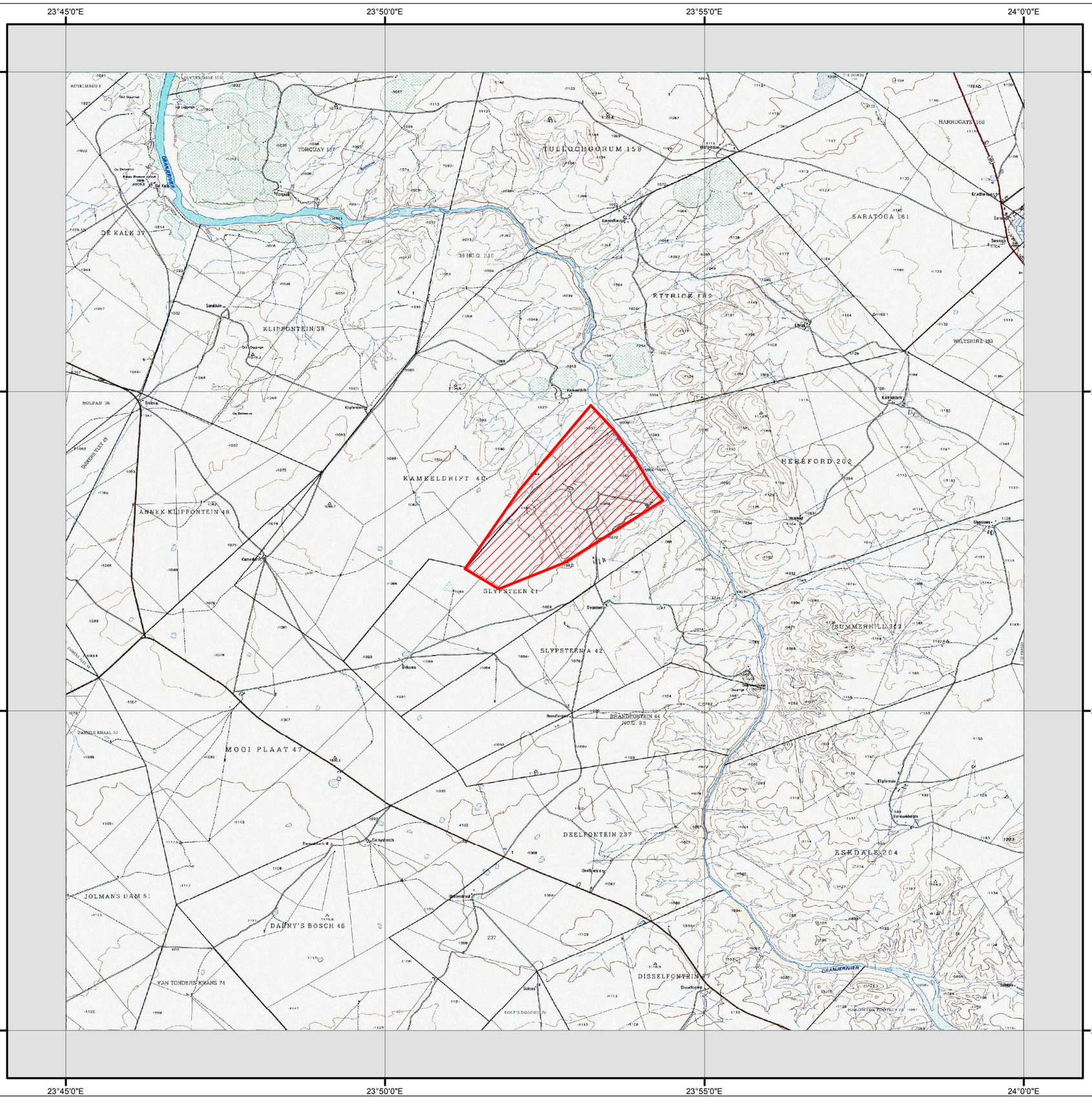
Plan 2

Sumer Seasons Trading (Pty) Ltd

Regional Setting
1: 50 000



Legend

Application Area

2923BD Torquay

DIGBY WELLS ENVIRONMENTAL

• Sustainability • Service • Positive Change • Professionalism • Future Focused • Integrity

Projection: Transverse Mercator
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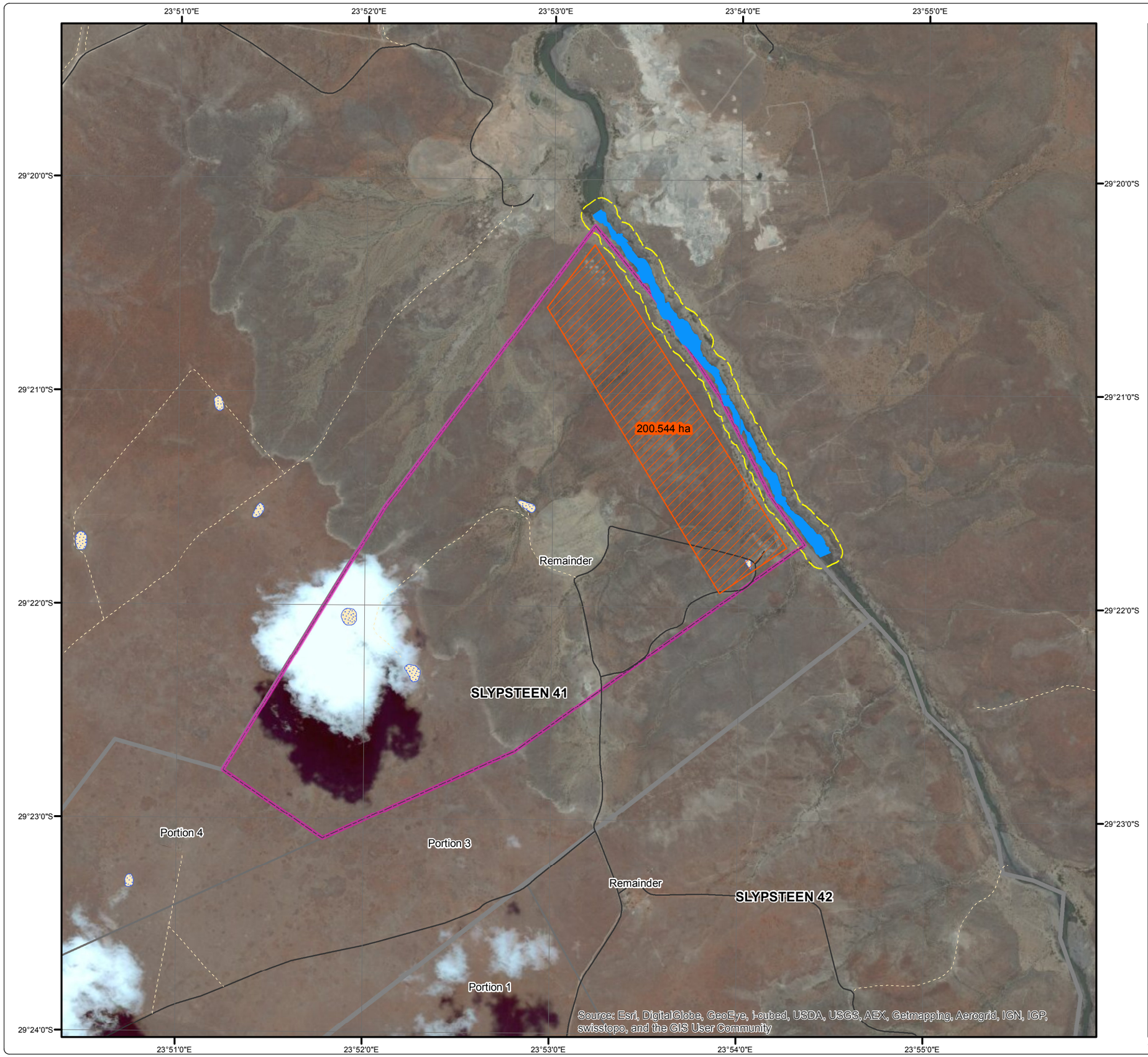
Kilometres

1:115 000

Plan 3

Summer Seasons Trading Ltd

Potential Bulk Sample Area



Legend

- Potential Bulk Sample Area
- Project Area
- Secondary Road
- Other Road
- Track / Footpath
- Perrenial River
- Non-Perrenial River
- Pan
- Farm Boundary
- Farm Portion Boundary
- 100m Buffer of Digitized River Area
- Digitized River Area

DIGBY WELLS ENVIRONMENTAL

• Sustainability • Service • Positive Change • Professionalism • Future Focused • Integrity

Projection: Transverse Mercator	Ref #:sdp.SUM2604.201401.131
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Central Meridian: 25°E	Date: 22/01/2013

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0 0.5 1 2

Kilometres

1:33 000

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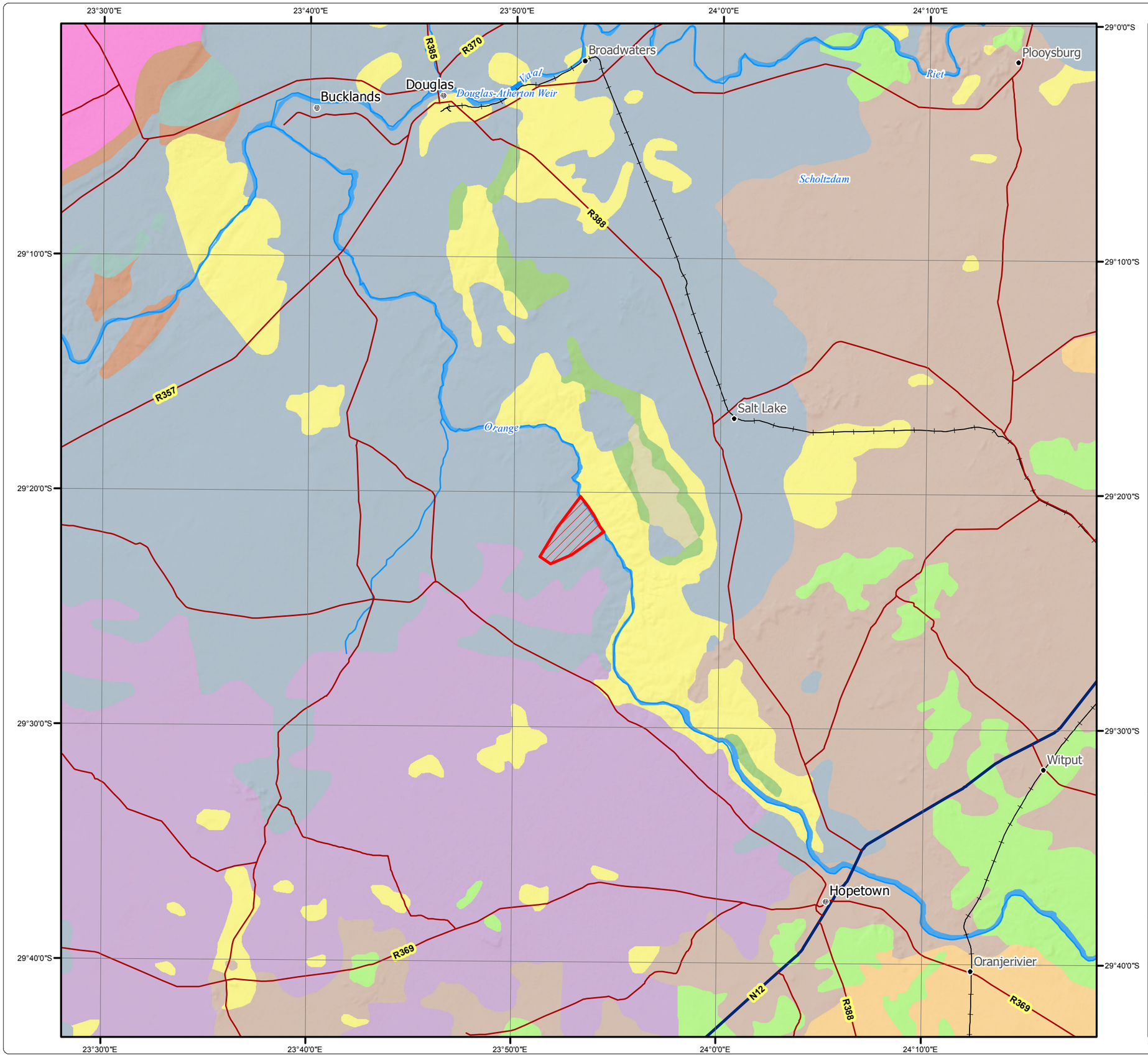
Plan 4

Summer Season Trading (Pty) Ltd

Geology



Legend

- Project Area
- Other Town
- Settlement
- Main Road
- National Road
- Railway Line
- River
- Dam

Geology

- Allanridge Fm, Platberg Grp
- Bothaville Fm, Ventersdorp Spgrp
- Cambell Rand Sbgrp, Ghaap Grp, Transvaal Spgrp
- Dwyka Grp, Karoo Spgrp
- Kalahari Grp
- Karoo Dolerite Sui
- Prince Albert Fm, Ecca Grp
- Schmidtsdrif Sbgrp, Ghaap Grp
- Swazian Erathem
- Volksrust Fm, Ecca Grp
- Vryburg Fm, Transvaal Spgrp

DIGBY WELLS ENVIRONMENTAL

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Kilometres

1:300 000

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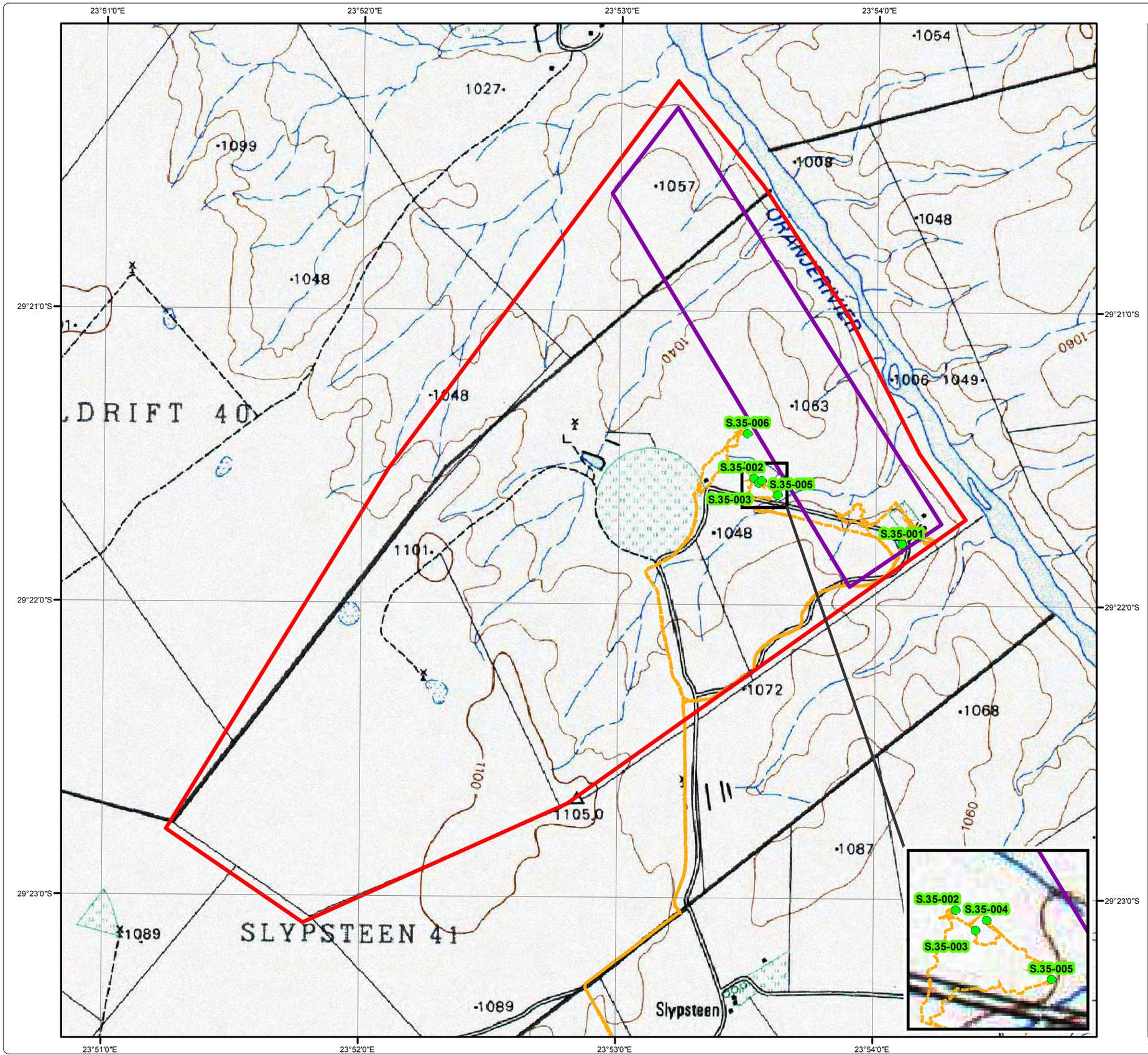
Plan 5

Sumer Seasons Trading (Pty) Ltd

HIA Points and Tracks



Legend

- Application Area
- Impact Area
- HIA Points
- HIA Tracks

2923BD Torquay

DIGBY WELLS ENVIRONMENTAL

• Sustainability • Service • Positive Change • Professionalism • Future Focused • Integrity

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Kilometres

1:24 000

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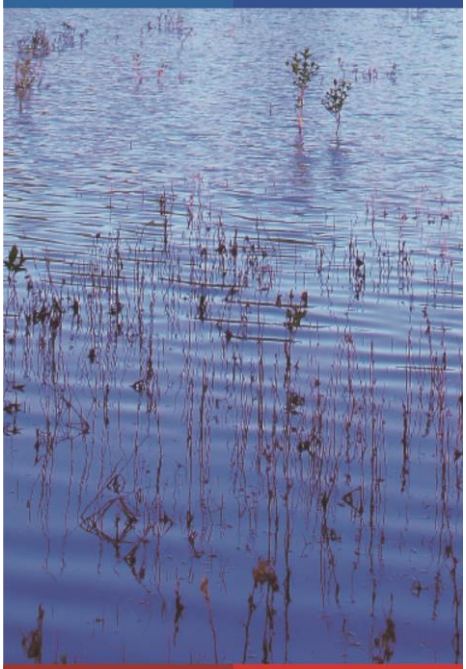
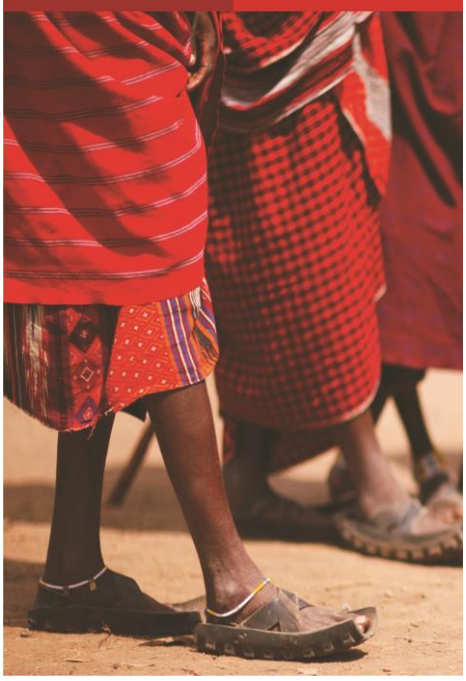
Appendix D: Assessment Methodology





DIGBY WELLS
ENVIRONMENTAL

Digby Wells Environmental

Heritage Impact Assessment Methodology

Date:

April 2014

Prepared by:

Johan Nel

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*Non-Executive

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1 Introduction

The impact assessment stage includes several steps aimed to evaluate the way in which environmental aspects will/may interact with the cultural landscape (the environment) resulting in environmental impacts to heritage resources. Environmental aspects and impacts are defined as:

- *Environmental aspects*: an element of an organisation's activities or products or services that can interact with the environment' (ISO 14001: 2004 - 3.6); and
- *Environmental impacts*: any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's environmental aspects (ISO 14001: 2004 - 3.7).

However, in terms of cultural heritage resources, environmental impacts should be assessed relative to the heritage value or significance of a resource. The methodology employed in the various stages of the impact assessment process is described in more detail below.

2 Statement of Significance

Heritage resources – both cultural and natural – are finite, non-renewable and irreplaceable. They characterise community identity and cultures and are therefore are intrinsic to the history and beliefs of communities. As sources of information, heritage resources have inherent potential to contribute significantly to research, education and tourism, as well as allowing capacity for reconciliation, understanding and mutual respect.

Considering the innate value of heritage resources, the foundation of heritage resources management (HRM) is the acknowledgement that heritage resources have lasting worth as evidence of the origins of life, humanity and society. Every generation is therefore morally obligated to act as trustees of heritage for future generations through conservation, preservation and protection.

Accordingly, HRM must take into account rights of affected communities to be consulted and to participate. Where heritage resources are developed and presented the dignity and respect of diverse cultural values must be ensured. In addition, heritage in its broadest sense must never be used for sectarian purposed or political gain.

Notwithstanding the fundamental value ascribed to heritage, significance of individual resources needs to be determined to allow implementation of appropriate management measures. This is achieved through assessing a heritage resource's value relative to certain prescribed criteria, encapsulated in international conventions as well as national legislation. This is addressed in Section 2.1 below.

The significance/value is established by determining the level of importance taking and assessing the degree of integrity of cultural heritage resources. A resource's value thus influences the intensity of environmental impacts. As a result, environmental impacts that are rated low may cause severe change in a heritage resources rated as highly significant. Vice versa, severe impacts may cause negligible change to an insignificant resource.

The steps involved in determining the value of a heritage resource is described in more detail below.

2.1 Importance

The importance of a heritage resource is determined on four dimensions – aesthetic, historic, scientific, and social. In turn, each dimension is measured against one or more descriptive attributes, defined in national legislation and international convention: NHRA (1999), UNESCO World Heritage Convention (1972), ICOMOS Guidance on Heritage Impact Assessments for Cultural World Heritage Properties and the Australian ICOMOS Charter for Places of Cultural Significance (1999) (Burra Charter). These attributes, or criteria, are aimed to provide a guide as to whether a resource should be included in the national estate as defined in these documents and presented in Table 2 1 below.

Importance of each dimension and subsequent attributes must be considered in relation to the resource's authenticity. Notions of authenticity are addressed under Section 2.1.1. Importance ratings must be informed and motivated by certain information sources. The credibility of information sources must therefore be evaluated and referred to when importance is discussed. Credibility is addressed under Section 2.1.2.

Table 2-1: Summary of dimensions and attributes

Dimension	Attributes considered		NHRA Ref.	UNESCO Ref.
Aesthetic & technical	1	Importance in aesthetic characteristics	S.3(3)(e)	Article 1
	2	Degree of technical / creative skill at a particular period	S.3(3)(f)	Article 1
Historical importance & associations	3	Importance to community or pattern in country's history	S.3(3)(a)	Article 1
	4	Site of significance relating to history of slavery	S.3(3)(i)	Article 1
	5	Association with life or work of a person, group or organisation of importance in the history of the country	S.3(3)(h)	Article 1
Information potential	6	Possession of uncommon, rare or endangered natural or cultural heritage aspects	S.3(3)(b)	Article 1 & Article 2
	7	Information potential	S.3(3)(c)	Article 1 & Article 2
	8	Importance in demonstrating principle characteristics	S.3(3)(d)	Article 1 & Article 2
Social	9	Association to community or cultural group for social, cultural or spiritual reasons	S.3(3)(g)	Article 1

2.1.1 Authenticity

Authenticity is an integral concept in cultural heritage resources management and must be considered when determining significance/value of cultural landscapes and heritage resources. The Nara Document on Authenticity (Nara Document) (1993) forms the basis of determining authenticity. Authenticity can refer to design, material, workmanship and setting of a resource. Aesthetic and historical aspects of a landscape or site including its physical, social and historical context, use and function are also covered (Winter & Baumann, 2005, p. 4).

Determining authenticity of a resource requires a sound knowledge of the type of heritage resource as well as the context within which occurs – the cultural landscape. This knowledge can only be gained through a detailed baseline accessing credible information sources.

2.1.2 Credibility

The Nara Document (1993) accepts that understanding authenticity and thus determining importance attributed to heritage resources rely on credible information sources. Information sources are defined as all physical, written, oral, and figurative sources, which make it possible to know the authenticity – nature, specificities, meaning, and history – of cultural heritage resources. This requires knowledge and understanding of information sources employed in relation to original and subsequent characteristics of heritage resources, and their meaning.

Information that should be considered are published, peer reviewed literature, archival research, popular publications, and any other information source that may be relevant (Nara Document on Authenticity, 1993).

Information sources need to be assessed as credible and truthful and referenced when determining importance of a resource and in motivation of its authenticity. Credibility of information sources forms the basis in determining the importance of heritage resources. The importance rating per dimension and attribute discussed above is thus intrinsically linked to the credibility of information sources used.

2.2 Integrity

Integrity is determined by examining the physical condition of a heritage resource – as witnessed at the time of assessment – compared to an ideal or other existing example. Integrity ought to be assessed only after the resource's authenticity has been determined, as the information source/s used should provide comparative examples against which its present condition may be measured. Thresholds and definitions for integrity are described in Table 2 2 below.

Table 2-2: Integrity definitions

Integrity	
0	Resource degraded to extent where no information potential exists; resource cannot be restored; single, isolated find, without any site context;
1	Poor condition, active decay visible; excessive restoration required; little information potential
2	Fabric is preserved, some information potential (quality questionable) and meaning evident, some encroachment on setting
3	Fair to good condition; well preserved; some decay present; can be easily restored/conserved/preserved; good information potential
4	Excellent/pristine; extremely well preserved; little to no decay present; little restoration required/restoration will greatly enhance resource; excellent information potential

3 Impact Assessment

Assessing environmental impacts on heritage resources are based first on the value of a resource and second how that value may change due to environmental aspects. Environmental management systems employ relative standard terminology that characterises impacts. This terminology has been adapted to provide a well-defined descriptive terminology for use in assessing environmental impacts on heritage resources summarised in Table 3 1.

Table 3-1: Impact characteristic terminology

Characteristic	Description	Designation
Type	Relationship of an assumed impact to a heritage resource (in terms of cause and effect)	Direct Indirect Induced
Scale of change	The physical area (size) of a heritage resource that may change	None Isolated parts / aspects will change Large parts / aspects will change Most or entire resource will change

Characteristic	Description	Designation
Duration	Time period over which resource will change	Immediate, non-permanent and fully reversible Long-term, non-permanent and reversible Long-term, permanent and irreversible Immediate, permanent and irreversible
Intensity	How an impact could change the authenticity and integrity, thus importance, of a resource	None Change in integrity without affecting authenticity Change in integrity will affect aspects of authenticity Change in integrity will affect overall authenticity
Probability	Likelihood of change occurring	None Project-related mitigation will remove change Project-related mitigation will reduce change Project-related mitigation will not reduce change

The rating takes into account the following criteria:

- Spatial scale of impact;
- Expected duration of impact; and
- Severity of impact;
- Consequence of impact;
- Probability of impact occurring; and
- Value of heritage resource

Impact significance = Value x Magnitude

Where

Value =Importance + Credibility + Integrity

And

Magnitude = Consequence x Probability

And

Consequence = Spatial scale + Duration + Severity

The impact rating is applied to pre- and post-mitigation scenarios. The ideal is to remove all impacts to a heritage resource. Where post mitigation significance is not zero, the recommended field rating (heritage) mitigation must be undertaken. The tables below provide the various descriptions and thresholds applicable to the impact assessment ratings.

Table 3-2: Description of magnitude ratings

Magnitude	Description
Major	Complete / total change to meaning, fabric, quality, setting and association of heritage resource. Permanent change to heritage resource
Moderate	Partial change to meaning, fabric, quality, setting and association of heritage resource. Permanent change to heritage resource
Minor	Limited change to meaning, fabric, quality, setting and association of heritage resource. Reversible change to heritage resource

Magnitude

Significance	Consequence (severity + scale + duration)								
Probability / Likelihood	1	3	6	7	9	12	15	18	21
1	1	3	6	7	9	12	15	18	21
2	2	6	12	14	18	24	30	36	42
3	3	9	18	21	27	36	45	54	63
4	4	12	24	28	36	48	60	72	84
5	5	15	30	35	45	60	75	90	105
6	6	18	36	42	54	72	90	108	126
7	7	21	42	49	63	84	105	126	147

Magnitude = Consequence x Probability

where

Consequence = scale + duration + severity

Table 3-3: Scores, descriptions and ratings determining consequence of impact

Scale		
Score	**Exposure**	**Description**
1	Very Limited	Isolated aspects of individual heritage resource
2	Limited	One or more heritage resource will be changed
3	Local	Most or all heritage resources change
4	Municipal area	Heritage resources outside project area changed
5	Region	Heritage resources within region
6	National	Will affect the entire country
7	International	The effect will occur across international borders
Duration		
Score	**Time period**	**Description**
1	Transient	Impact may be sporadic/limited duration and can occur at any time. E.g. Only during specific times of operation, and not affecting heritage value
2	Short Term	Impact will remain for <10% of Project Life
3	Permanent	Impact will remain for >10% - 50% of Project Life
4	Beyond Project Life	Impact will permanently alter or change the heritage resource and/or value (Complete loss of information)
5	Project Life	Impact will reduce over time after project life (Mainly renewable resources and indirect impacts)
6	Long Term	The impact will cease after project life.
7	Medium Term	Impact will remain for >50% - Project Life
Severity		
Score	**Scale of change**	**Description**
1	Minor (Low Value)	No change to Heritage Resource with values medium or higher, or Any change to Heritage Resource with Low Value
2	Minor (Medium –	Minor change to Heritage Resource with Medium - Medium High

	High Value)	Value
3	Moderate (Medium – High Value)	Moderate change to Heritage Resource with Medium - Medium High Value
4	Major (Medium – High Value)	Major change to Heritage Resource with Medium-Medium High Value
5	Minor (High – Very High Value)	Minor change to Heritage Resource with High-Very High Value
6	Moderate (High – Very High Value)	Moderate change to Heritage Resource with High-Very High Value
7	Major (High – Very High Value)	Major change to Heritage Resource with High-Very High Value
Probability		
Score	**Probability**	**Description**
1	Highly Unlikely /None	Expected never to happen, impact will not occur
2	Rare / Improbable	Conceivable, but only in extreme circumstances, Have not happened during lifetime of the project but has happened elsewhere. The possibility of the impact materialising is very low as a result of design, historic experience or implementation of adequate mitigation measures
3	Unlikely / Low probability	Has not happened yet but could happen once in the lifetime of the project, there is a possibility that the impact will occur
4	Probable	Could happen, has occurred here or elsewhere
5	Likely	Could easily happen, the impact may occur
6	High probability	Happens often, it is most likely that the impact will occur
7	Certain/Definite	Happens frequently, the impact will occur regardless of the implementation of any preventative or corrective actions

Table 3-4: Significance of impact on categories of heritage resources

Score	Magnitude of Impact			
	Rating	Archaeology, Palaeontology	Built Environment/Structures	Historic Landscape
1-37	No change	No change	No change to fabric or setting	No changes to landscape elements, parcels or components; no visual or audible changes; no changes in amenity or community factors.
38-74	Minor	Very minor changes to key archaeological materials, or setting.	Slight changes to historic building elements or setting that hardly affect it.	Very minor changes to key historic landscape elements, parcels or components; virtually unchanged visual effects; very slight changes in noise or sound quality; very slight changes to use or access; resulting in very small change to historic landscape character.
75-110	Moderate	Changes to key archaeological materials, such that the resource is slightly altered; slight changes to the setting.	Change to key historic building elements, such that the resource is slightly different; change to setting of an historic building, such that it is noticeably changed.	Change to few key historic landscape elements, parcels or components; slight visual changes to few key aspects of the historic landscape; limited changes in noise or sound quality; slight changes to use or access; resulting in limited changes to historic landscape character.

Score	Magnitude of Impact			
	Rating	Archaeology, Palaeontology	Built Environment/Structures	Historic Landscape
111-147	Major	Changes to many key archaeological materials, such that the resource is clearly modified; changes to the setting that affect the character of the asset	Change to many key historic building elements, such that the resource is significantly modified; change to setting of an historic building, such that it is significantly modified.	Change to many key historic landscape elements, parcels or components; visual change to many key aspects of the historic landscape; noticeable differences in noise or sound quality; considerable changes to use or access; resulting in moderate changes to historic landscape character.
		Changes to attributes that convey outstanding national value of national estate; Most or all key archaeological materials, including those that contribute to ONV such that the resource is totally altered; comprehensive changes to setting	Change to key historic building that contributes to outstanding national value of national estate such that the resource is totally altered; Comprehensive changes to setting.	Change to most or all key historic landscape elements, parcels or components; extreme visual effects; gross change of noise or change to sound quality; fundamental changes to use or access; resulting in total change to historic landscape character unit and loss on outstanding national value.

4 References

Nara Document on Authenticity, 1993. ICOMOS: The Nara Document on Authenticity, United Nations Educational, Scientific and Cultural Organisation: International Council on Monuments and Sites.

Winter, S. & Baumann, N., 2005. Guideline for Involving Heritage Specialist in EIA Process Edition 1: CSIR Report No ENV-S-C 2005 E , Cape Town: Republic of South Africa, Provincial Government of the Western Cape, Department of Environmental Affairs & Development Planning.