

SHELL INTERNATIONAL EXPLORATION AND PRODUCTION B.V.

**DRAFT Technical Report in support of the
EMP for the South Western Karoo Basin
Gas Exploration Application Project**

CULTURAL HERITAGE: CENTRAL PRECINCT



ACTIVE HERITAGE cc.

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EXECUTIVE SUMMARY

Active Heritage cc has been appointed by Golder Associates Africa (Golder) on behalf of Shell Exploration Company B.V. (Shell), to undertake a desktop Heritage Scoping Level report, as part of the EMP process, of the proposed 30 000 square kilometre exploration area in the south western Karoo Basin referred to as the Central Precinct.

The main aim of this desktop study is to provide a synopsis of the heritage resources in the Central Precinct. The results of the desktop study indicated that available data is limited. Only a few heritage surveys have been conducted in the Central Precinct. Nevertheless, the available data indicate that heritage resources are varied and widely distributed in the study area. These include rock art sites, stone age sites and tool scatters, historical buildings associated with villages and farmsteads, graveyards, and potential cultural landscapes. Unfortunately, the exact co-ordinates of the majority of these sites are not given in the existing databases and a site specific ground survey will be required in the areas earmarked for gas drilling, once they have been identified.

DRAFT

ACRONYMS AND ABBREVIATIONS

ESA	Early Stone Age
HISTORIC PERIOD	Since the arrival of the white settlers - c. AD 1770 in this part of the country
IRON AGE	Early Iron Age AD 200 - AD 1000 Late Iron Age AD 1000 - AD 1830
LIA	Late Iron Age
LSA	Late Stone Age
MSA	Middle Stone Age
NEMA	National Environmental Management Act, 1998 (Act 107 of 1998) and associated regulations.
NHRA	National Heritage Resources Act, 1999 (Act No. 25 of 1999) and associated regulations (2000)
SAHRA	South African Heritage Resources Agency
STONE AGE	Early Stone Age 2 000 000 - 250 000 BP Middle Stone Age 250 000 - 25 000 BP Late Stone Age 30 000 - until c. AD 200

DEFINITIONS OF TERMINOLOGY

Archaeology: Remains resulting from human activities that are in a state of disuse and are in or on land which are older than 60 years, including artefacts, human and hominid remains, and artificial structures and features.

Early Stone Age: the archaeology of the Stone Age between 700 000 and 2500 000 years ago.

Heritage: That which is inherited and forms part of the National Estate (Historical places, objects, fossils as defined by the National Heritage Resources Act of 25 of 1999).

Holocene: the most recent geological period that commenced approximately 10 000 years ago.

Late Stone Age: The archaeology of the last 20 000 – 30 000 years associated with fully modern people.

Middle Stone Age: The archaeology of the Stone Age between 20 000 and 300 000 years ago associated with early modern people.

Iron Age: The archaeology of the last 2000 years associated with Bantu-speaking agro-pastoralists.

National Estate: the collective heritage assets of the nation.

SAHRA: The South African Heritage Resources Agency – the compliance agency that protects national heritage.

Structure (historic): Any building, works, device or other facility made by people and which is fixed to land, and includes any fixtures, fittings and equipment associated therewith. Protected structures are those which are over 60 years old.

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1.0 BRIEF OVERVIEW OF THE PROPOSED EXPLORATION APPLICATION PROJECT

Active Heritage cc has been appointed by Golder Associates Africa (Golder) on behalf of Shell Exploration Company B.V. (Shell), to undertake a desktop Heritage Scoping Level report, as part of the EMP process, of the proposed 30 000 square kilometre exploration area in the south western Karoo Basin referred to as the Central Precinct.

The precinct intersects the Eastern, Western and Northern Cape Provinces, and covers the Cacadu, Central Karoo, Chris Hani, and Pixley ka Seme District Municipalities (Figure 1).

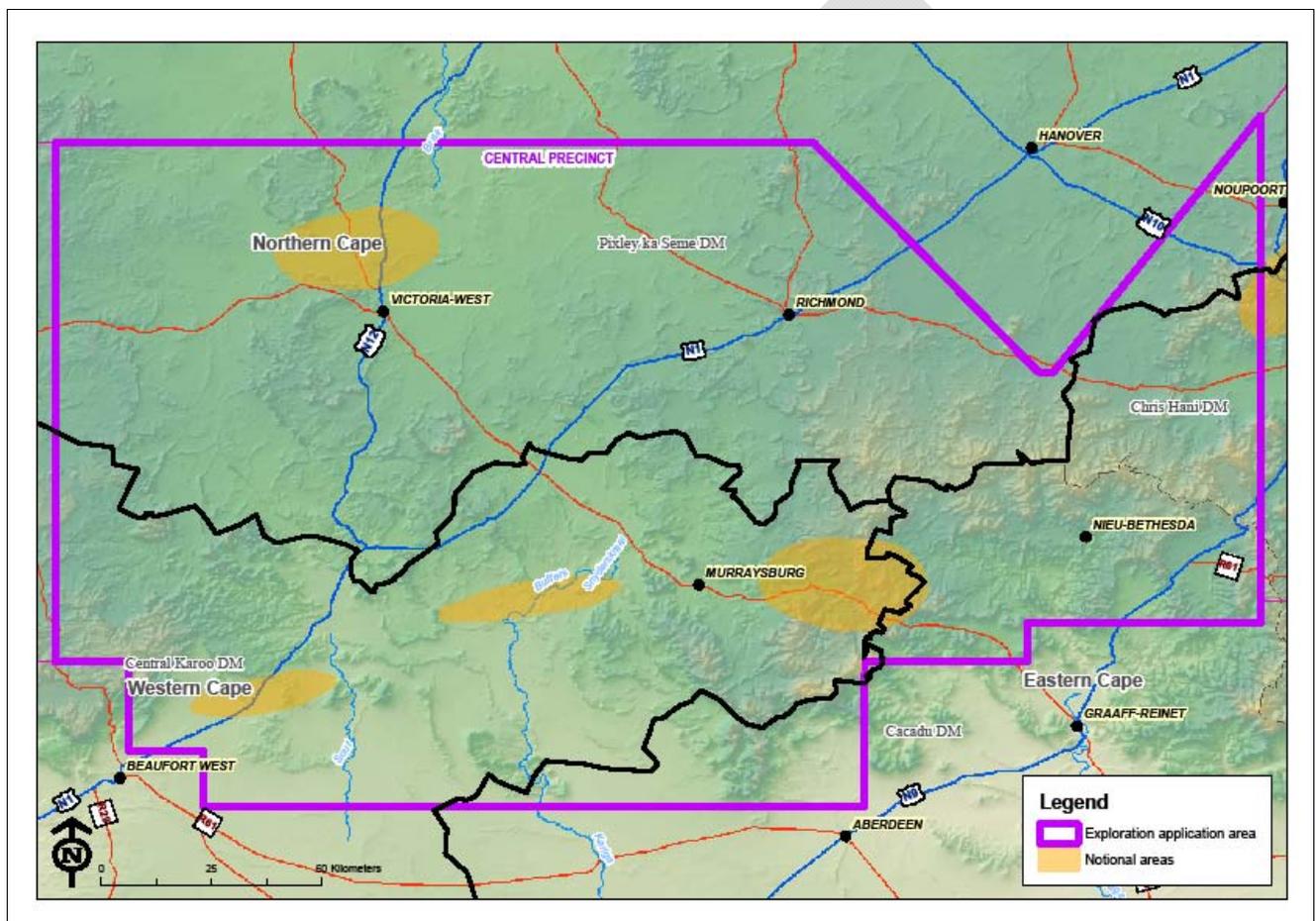


Figure 1: South Western Karoo, Central Precinct (purple line) and possible areas within which suitable well sites may be identified for future exploration drilling activities (orange polygons).

2.0 OBJECTIVES AND AIMS OF THIS STUDY

Active Heritage cc was subcontracted by Golder to undertake a desktop cultural heritage assessment for the South Western Karoo Basin, Central Precinct (Figure 1). This first phase of a cultural heritage assessment is required as a preliminary desktop exercise to identify potential heritage resources which may be impacted during site preparation, drilling and hydraulic fracturing, and decommissioning. The conclusions reached are entirely based on the available literature and the consultation of accessible heritage databases and registers. The project seeks to assess the value and significance of the known heritage resources found within the study area as well as ensure their protection and conservation. The view is promoted that development should take place in harmony with the sustainable use of heritage resources.

At this stage of the process, the heritage practitioner is required to provide:

- Description of the exploration application area in terms of cultural heritage; and
- Description of potential impacts of proposed exploration activities on heritage resources.

3.0 LEGISLATION

The National Heritage Resources Act 1999 (Act No. 25 of 1999) (NHRA) prescribes the manner in which heritage resources are assessed and managed. Section 3 (2) of this act defines South Africa's heritage resources to include:

- a. places, buildings, structures and equipment of cultural significance;*
- b. places to which oral traditions are attached or which are associated with living heritage;*
- c. historical settlements and townscapes;*
- d. landscapes and natural features of cultural significance;*
- e. geological sites of scientific or cultural importance;*
- f. archaeological and palaeontological sites;*
- g. graves and burial grounds, including-*
 - i. ancestral graves;*
 - ii. royal graves and graves of traditional leaders;*
 - iii. graves of victims of conflict;*
 - iv. graves of individuals designated by the Minister by notice in the Gazette;*
 - v. historical graves and cemeteries; and*
 - vi. other human remains which are not covered in terms of the Human Tissue Act, 1983 (Act No. 65 of 1983);*

h. sites of significance relating to the history of slavery in South Africa;

i. movable objects, including-

- i. objects recovered from the soil or waters of South Africa, including archaeological and palaeontological objects and material, meteorites and rare geological specimens;*
- ii. objects to which oral traditions are attached or which are associated with living heritage;*
- iii. ethnographic art and objects;*
- iv. military objects;*
- v. objects of decorative or fine art;*
- vi. objects of scientific or technological interest; and*
- vii. books, records, documents, photographic positives and negatives, graphic, film or video material or sound recordings, excluding those that are public records as defined in section 1(xiv) of the National Archives of South Africa Act, 1996 (Act No. 43 of 1996)."*

The NHRA also stipulates in Section 3 (3) that a place or object is to be considered part of the national estate if it has cultural significance or other special value because of:

"a. its importance in the community, or pattern of South Africa's history;

b. its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;

c. its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;

d. its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;

e. its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;

f. its importance in demonstrating a high degree of creative or technical achievement at a particular period;

g. its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;

h. its strong or special association with the life or work of a person, group or organisation of importance in the history of South Africa; and

i. sites of significance relating to the history of slavery in South Africa."

The NHRA also protects intangible heritage such as traditional activities, oral histories and places where significant events happened.

3.1 Relevant Authority

The relevant authority is the applicable local heritage agency; Western Cape Heritage is the relevant authority for those areas that fall within the Western Cape Province, whereas the SAHRA is the relevant authority for all other areas. The Northern Cape has a Built Environment Committee that will assess the built environment aspects of the project.

3.2 Significance rating / grading of heritage sites

Heritage resources are rated / graded in terms of significance. Heritage resources significance is determined through an assessment and grading criteria in terms of Section 7 of NHRA. In addition, in 2005, the SAHRA designed criteria (Table 1) to provide assistance and guidance for heritage resources rating and significance determination.

The SAHRA is responsible for heritage resources of national significance while the Provincial Heritage Resources Authorities are responsible for provincial heritage resources. It is important to note that the assessment of the significance of and rating of heritage resources depends on their state of conservation at the time of the assessment.

Table 1: Field rating and recommended grading of sites (SAHRA 2005)

Level	Details	Action
National (Grade I)	The site is considered to be of National Significance	Nominated to be declared by SAHRA
Provincial (Grade II)	This site is considered to be of Provincial significance	Nominated to be declared by Provincial Heritage Authority
Local Grade IIIA	This site is considered to be of HIGH significance locally	The site should be retained as a heritage site
Local Grade IIIB	This site is considered to be of HIGH significance locally	The site should be mitigated, and part retained as a heritage site
Generally Protected A	High to medium significance	Mitigation necessary before destruction
Generally Protected B	Medium significance	The site needs to be recorded before destruction
Generally Protected C	Low significance	No further recording is required before destruction

4.0 STUDY APPROACH / METHODOLOGY

This first phase heritage assessment is entirely based on a desktop study. No field surveys took place during this phase.

4.1 Desktop

3.1.1 Literature Survey

A survey of the literature pertinent to the region, including archaeological, anthropological and historical sources was conducted to assess the potential of heritage resources within the area. Past heritage impact assessment survey reports conducted within the general project provided useful data as well. Unfortunately these only covered a few selected parts of the project area and many gaps remain.

3.1.2 Databases

The SAHRA web portal for gazetted sites, objects and shipwrecks was consulted. The Heritage Register List of SAHRA was also used to shed light about heritage resources present in the area. The archaeological databases of the Albany Museum in Grahamstown and National Museum, Bloemfontein provided some information relating to archaeological resources in the study area. The SARADA database of rock art in Africa was also consulted. The latter is housed at the Rock Art Research Institute at the University of the Witwatersrand.

4.2 Restrictions and assumptions

- The available databases are incomplete. Large areas of the study area have never been surveyed from a heritage perspective. The GPS coordinates are not available for all the listed sites.
- The study area has not been subject to a field survey. This is entirely a desktop based survey and no field or ground surveys were conducted. However, these will commence furthering the next phase of project.

5.0 STUDY RESULTS / BASELINE DESCRIPTION OF THE STUDY AREA

5.1 Desktop

4.1.1. Pre-colonial Archaeology

Large portions of the Northern Cape Province have been thoroughly surveyed for heritage sites by the Archaeology Department of the McGregor Museum in Kimberley (Beaumont *et al.*, 1990). However, most of these areas occur to the north of the Central Precinct. Dr Janette Deacon, formerly of the National Monuments Council, surveyed the area to the immediate northwest of the

Central Precinct in her research on /Xam San archaeology and symbolic use of landscape (Deacon, 1986 and 1988; Deacon and Dowson 1996; Deacon and Foster 2005). The Archaeology Department of the Albany Museum, Grahamstown conducted a small survey in the Camdeboo National Park, near the south-eastern border of the Central Precinct, in the 1980's. Smaller sporadic visits to rock art sites were conducted by various researchers in the area in the last 20 years, notably by archaeology staff of the National Museum Bloemfontein, the Rock Art Research Institute, and the McGregor Museum, Kimberley. Some heritage impact assessments have been conducted at substations near Victoria-West, and Beaufort-West. The extensive Gamma Grassridge transmission line that runs from Port Elizabeth to near Victoria-West cuts through a large section of the Central Precinct. The heritage survey conducted along the proposed route gives a good indication of the type of heritage site to be expected in the southern and central sections of the Central Precinct. Van Schalkwyk and Wahl (2007) reported isolated scatters of stone tools on the plains, some rock painting sites in the mountains of the Camdeboo, and freshwater shell middens containing bone, stone tools, and food remains along river banks, pans and flood plains. The most comprehensive archaeological survey in the area was conducted by Professor Garth Sampson and his students over a period of 30 years in the Upper, Middle and Lower Seacow River. Part of area surveyed cuts across the Eastern Precinct as well. More than 16 000 Stone Age sites were recorded during this period (Sampson 1985). Rock art sites occur at various localities in the Central Precinct. Perhaps the best known site is the rock engravings at Nelspoort near Beaufort–West in the south western section of the Central Precinct. This site has recently been developed for tourism purposes. The SARADA data base of rock art indicates that rock paintings and engravings occur at various localities within the Central Precinct. Rock art has been recorded on four other farms near Beaufort-West, at sixteen different localities in the greater Richmond area, at two farms near Murraysburg, at two farms near Nieu Bethesda, and at one locality near Victoria West (Van Riet-Lowe 1941).

Although the Karoo is presently more suited to the keeping of small stock, such as sheep and goats research has shown that, at about 1200 – 1400AD, a global climatic fluctuation (known as the Little Ice Age) may well have caused an increased rainfall in the Central Karoo resulting in the area being more suitable for the grazing by cattle and occupation by Khoekhoen pastoralists. Archaeological of pastoralist occupation of vast areas in the Karoo are indicated by various stone kraal complexes of which several hundred have been recorded in the Zeekoe River Valley in the Central and Eastern Precinct of the study area (Sampson 1985).

4.1.2. Colonial Archaeology

The indigenous San of the Karoo waged a bitter war against colonial expansion as they gradually lost control of their traditional land. The historian Nigel Penn (2005) noted that the most determined indigenous resistance to Trekboer expansion occurred when they entered the harsh environment of the escarpment of the interior plateau (Hantam, Roggeveld and Nieuweveld Mountains). Being pastoralists themselves the Trekboers settled on the escarpment where most of the springs were found. From here they were able to exploit the grazing lands further west and north. The Trekboers were highly mobile, each had a farm in the Karoo called a legplaats. Winters were very severe and the Trekboers had to move regularly. Often farms were abandoned, not only due to the San who raided them for livestock, but also due to drought and poor grazing. Disputes over farm boundaries were intense. The first recorded loan farms in the area date to around 1770 and most of the farms in the area were surveyed by the mid to late nineteenth century.

Resistance to the Trekboer expansion from the indigenous San was particularly intense in this area. Koerikei, the bullet escaper, was the leader of the San in the vicinity of Graaff-Reinett during the 1770's – a period that saw major animosity between the San and Trekboers as the latter invaded new areas formerly only occupied by the San. Koerikei has become famous in the historiographic literature for symbolising the resistance of the San to the expansion of the colonial frontier in the eighteenth century (Penn 2005; Adhikari 2010). This period of conflict (i.e. 1756-1787) has also been called the period of the Bushman Wars – a period that ultimately saw the implementation of a policy of genocide against the San in the project area. The severity of the conflict between the invading Trekboers and the nomadic San of this region has been graphically described by the historians Nigel Penn (2005) and Mohamed Adhikari (2010). Within a few decades the Trekboers, and other colonial agents, hunted all the large game of the Karoo, to near extinction. Homesteads were typically erected at springs or other water sources previously frequented by the San. The San were forced to initiate a pattern of livestock raids in order to survive but also as a method to regain their former independence of the land. The San often attacked farms at dawn, killed the livestock herders who were often Khoi or San themselves, and then chased the cattle up the mountain passes of the Sneeuwberg where they would often offer fierce resistance to pursuing commandos. Literally thousands of San were killed by commando's during this period. San children and women were often captured and taken back to the farms as a form of slavery known as "inboekelinge". Captured San women were sometimes given as wives to Khoi auxiliaries who aided the Trekboers in exterminating the San. But San resistance to colonial expansion was also fierce. In fact, it halted the expansion of the north eastern frontier with almost 100 years.

When the famous traveller Robert Gordon travelled through the Camdeboo, in the southern section of the Central Precinct, many frontier farmers had abandoned their farms in the Sneeu Berg Mountains out of fear for being attacked by the San. The traveller Andrew Sparman made a similar observation a few years earlier in 1772. However, by 1880 San resistance to colonial expansion in the Karoo was something of the past (Gall 2002). Those San who were not killed by colonial forces were carried off to farms as labourers where they soon intermarried with colonial Khoi, slaves as well as people of European descent to form a new population group collectively known as “coloureds” (Smith et al 2000).

From the above it can be predicted that there may be a number of old graveyards and possibly historic buildings belonging to the early Trekboer period on various farms in the area. However, none of these have been assessed. Another notable feature is the corbelled houses that developed as a vernacular architecture of the northern Karoo and “Bushmanland” districts during the nineteenth century. These have been developed to cope with a scarcity of wood as a building resource and as a measure to combat San attacks (Oberholster 1972). The majority of these occur near Williston and Carnarvon in the Western Precinct. However, some do occur near Beaufort-West in the Central Precinct and one has been declared provincial heritage site (Oberholster 1972). Other declared provincial heritage sites include:

- Twelve historical buildings in Beaufort-West
- The old powder magazine at Murraysburg
- Two declared provincial heritage sites near Noupoot. These include a blockhouse from the Anglo-Boer War and a church building.
- One historical building declared as a provincial heritage site at Victoria-West. Ninety other historical sites, mostly homesteads, are listed on the SAHRA register as occurring in this town.
- Two historical buildings declared as provincial heritage sites at Richmond. Sixty three other historical sites, mostly homesteads, are listed on the SAHRA register as occurring in this town.

4.1.3. Cultural landscapes and sense of place

As no field surveys have been undertaken and descriptions of the receiving environment is based on published material and aerial maps it is difficult to establish whether specific areas could be described as cultural landscapes. Nevertheless, the landscape of the Central Precinct can be described as a remote arid landscape and its visual qualities linked to the undulating topography and undisturbed nature of the landscape. The only intrusions are existing transmission lines,

scattered homesteads, wind pumps, and access roads. These contribute to the rural landscape. “There is a perceived sense of absence of human intervention or intrusion” (Patrick et al. 2009), the vast empty expanses exemplifying the qualities of the Karoo.

The historic town of Graaff-Reinett situated to the immediate south of the Central Precinct would be an ideal candidate for nomination as a cultural landscape. This scenic town harbours almost 200 provincial heritage sites – more than any other town in South Africa (Oberholster 1972). These are mostly historic buildings belonging to the 19th century period, however, the town is also situated in the mountain shadows of the Camdeboo National Park – an area that contains various San hunter-gatherer and Khoekhoen pastoralist archaeological sites as well as rock art. The scenic natural heritage site of the “Valley of Desolation” is also situated within this Provincial Park. Various memorials and monuments relating to the Khoisan genocide, Voortrekker leaders, Anglo-Boer War, and the more recent struggle history of South Africa are located in and around this town. Although not strictly situated within the borders of the Central Precinct it does indicate the potential that may exist for similar cultural landscapes in areas less well surveyed and documented within the study area.

A possible extension of the cultural landscape of Graaf-Reinett would be the Sneeuberge (Snow Mountains) the mountainous area immediately to the north of the town and well situated within the Central and Eastern Precincts of the study area. Not only is the Sneeuberge a prominent physical marker on the landscape of the Eastern Karoo but it is an important icon in the sad history of the now extinct Karoo San. For many decades this area functioned as the last stronghold of the San. At one point San resistance here was so effective against colonial expansion that it effectively halted Trekboer movement for almost 30 years (Penn 2003; Adhikari 2010). The Sneeuberg and adjacent areas contain numerous Later Stone Age sites associated with San settlement of the central interior. The Seacow River area alone contains around 16 000 sites (Sampson 1985). This is more than any other area of comparable size in southern Africa. Here, as well as elsewhere in the larger Sneeuberg area are numerous San rock painting and engraving sites. Some spectacular examples occur on the farm Ganora not far from the little town of Nieu Bethesda, itself an interesting village filled with historical buildings and ambiance. Although not inhabited by Khoekhoen pastoralists in historical times there is archaeological evidence for their occupation of the area during wetter climatic epochs such as during the so-called Little Ice Age around 1400 AD. Old buildings and graves relating to early Trekboer history occur on various farms in the area (Van Schalkwyk & Wahl 2007). In addition, the area contains numerous palaeontological sites. However, there is a need to compile a thorough inventory of heritage sites in this area and that can only happen once ground surveys have been initiated.

4.1.4 Discussion

As the Central Precinct has only seen limited heritage surveys and investigations in the past it would be meaningless to produce a map indicating the heritage sensitive spots in this area based on the desktop survey of available data. As indicated previously, this survey needs to be supplemented by ground surveys (subsequent to site selection) in order to provide a more comprehensive picture of heritage sites and features on the landscape. Based on the available heritage data it is possible to indicate broad patterns that may assist the site selection team in avoiding heritage sites and the potential damage thereof. These are provided in Section 8.1 below.

6.0 TECHNICAL ASSESSMENT

6.1 Exploration activities that could potentially impact the environment¹

Cultural heritage includes both tangible and intangible aspects. The tangible aspects of heritage such as archaeological sites, historical buildings, and to some extent cultural landscapes are for the most part non-renewable. Unlike natural resources tangible, cultural heritage cannot be renewed once damaged or destroyed. Land rehabilitation measures will have no effect on tangible cultural heritage once altered or destroyed. Exploration related activities which could potentially damage heritage sites or structures are outlined below.

Well site preparation

- Construction of access roads and preparation of the well site could damage heritage sites and features in the immediate environs of the well site. The generation of dust could pose a threat to rock paintings in close proximity to the site.
- Transportation of exploration equipment / vehicle movement outside of existing roads. Large areas of the Karoo are flat and it would be relatively easy to drive with a high clearance vehicle over these parts. However, stone tools scatters and other heritage features may occur in these flat areas and will be at risk, if the transportation is not limited to roads.

Exploration drilling and hydraulic fracturing

- Drilling and hydraulic fracturing could damage heritage sites and features in the near environs of the well site. Excessive dust created by drilling activities could also damage certain heritage sites such as rock paintings.

¹ It is assumed that geophysical data acquisition (e.g. Magneto-Telluric Surveys) will have negligible impacts on cultural heritage aspects and thus has been excluded from this assessment.

- Explorative drilling may unearth heritage material not located during the heritage ground survey. Should any heritage site or artefacts be unearthed then all activities should stop immediately and the local heritage agencies (i.e. Western Cape Heritage and SAHRA) be contacted for further evaluation. It is recommended that a heritage awareness guide be provided to the well site preparation personnel and drilling crew to help them identify heritage resources, should they be unearthed during activities.

Decommissioning

- It is unlikely that decommissioning should have any potentially negative impact on heritage sites and features not previously addressed. However, land rehabilitation processes may have a negative impact on heritage sites in the immediate environs of the rehabilitation site.

6.2 Description of the technical assessment methodology

Potential significance of impacts was based on occurrence and severity, which are further subdivided as follows:

Occurrence		Severity	
Probability of occurrence	Duration of occurrence	Magnitude (severity) of impact	Scale / extent of impact

To assess each impact, the following four ranking scales are used:

PROBABILITY	DURATION
5 - Definite/don't know	5 - Permanent
4 - Highly probable	4 - Long-term
3 - Medium probability	3 - Medium-term (8-15 years)
2 - Low probability	2 - Short-term (0-7 years) (impact ceases after the operational life of the activity)
1 - Improbable	1 - Immediate
0 - None	
SCALE	MAGNITUDE
5 - International	10 - Very high/don't know
4 - National	8 - High
3 - Regional	6 - Moderate
2 - Local	4 - Low
1 - Site only	2 - Minor
0 - None	

The significance of the two aspects, occurrence and severity, is assessed using the following formula:

$$\text{SP (significance points)} = (\text{probability} + \text{duration} + \text{scale}) \times \text{magnitude}$$

The maximum value is 150 significance points (SP). The impact significance will then be rated as follows:

SP >75	Indicates high environmental significance	An impact which could influence the decision about whether or not to proceed with the project regardless of any possible mitigation.
SP 30 – 75	Indicates moderate environmental significance	An impact or benefit which is sufficiently important to require management and which could have an influence on the decision unless it is mitigated.
SP <30	Indicates low environmental significance	Impacts with little real effect and which should not have an influence on or require modification of the project design.
+	Positive impact	An impact that is likely to result in positive consequences/effects.

6.3 Assessment

Table 2 below summarises those impacts directly related to the proposed exploration project, and provides a significance rating for each impact before and after mitigation.

Table 2: Technical Assessment Matrix for the proposed South Western Karoo Basin Gas Exploration Application Project

POTENTIAL ENVIRONMENTAL IMPACT	ENVIRONMENTAL SIGNIFICANCE											
	Before mitigation						After mitigation					
	M	D	S	P	Total	SP	M	D	S	P	Total	SP
<i>Cultural Heritage</i>												
Construction of access roads and preparation of the well site could damage heritage sites and features in the immediate environs of the well site. The generation of dust could pose a threat to rock paintings in close proximity to the site.	6	5	2	3	60	Mod	2	5	2	1	16	Low

Construction of access roads and the well site could damage heritage sites and features in the immediate environs of the proposed well site.

Impacts of moderate significance are expected if the proposed access road is situated within the immediate environs of a heritage site (i.e. within 20 m), if the proposed well site is located within 50 m from a heritage site, and the proposed well site and/or access road are located within 100 m of rock art sites.

Should the following mitigation measures be implemented prior to site preparation and construction, impact significance will be reduced to low:

- During well site selection, no sites should be placed within 100 m of declared national and provincial heritage sites.
- Once the preliminary sites are selected, a site specific cultural heritage impact assessment will need to be conducted to identify any heritage sites and features. Based on the findings of the assessment:
 - No access roads should be constructed within 20 m of identified heritage sites and features which are rated as sites of high local significance by the South African Heritage Resources Agency (SAHRA) (see Table 1 above);
 - No well sites should be constructed within 50 m of heritage sites and features which are rated as sites of high local significance by the SAHRA; and
 - No well sites or access roads should be constructed within 100 m of rock art sites which are rated as sites of high local significance by the SAHRA.

The site specific cultural heritage impact assessment will therefore inform final site selection.

Note: the SAHRA usually allows for development to commence where heritage sites or features are rated as sites of low significance (i.e. are not of any regional or local importance and/or are duplicated in many areas).

Should heritage sites rated as sites of medium to high significance be located within the above-mentioned buffer zones in relation to the selected well sites, appropriate mitigation measures will need to be implemented, in consultation with the relevant heritage agency. Mitigation could entail rescue excavation, once a permit is granted by the SAHRA.

Should any archaeological or heritage features artefacts be uncovered during exploration, all activities must be stopped and an archaeologist accredited with the Association for Southern African Professional Archaeologist (ASAPA) approached in order to determine appropriate mitigation measures for the discovered finds, if necessary. Mitigation of heritage sites will be called for when they are rated as of medium to high significance. Mitigation could entail rescue excavation of relevant heritage sites - once a permit is granted for excavation by the SAHRA. If the relevant heritage sites include graves then the protocol provided in Section 36 of the National Heritage Resources Act, 1999 (Act 25 of 1999), regarding grave exhumation, will be followed (see APPENDIX 1).

It is recommended that a heritage awareness guide be provided to the well site preparation personnel and drilling crew to help them identify heritage resources, should they be unearthed as a result of the exploration related activities.

6.4 Assumptions and knowledge gaps / limitations

- It is assumed that the vibrations caused by the proposed drilling will not have a negative impact on sites situated more than 100 m from the 1 hectare well sites.
- It is assumed that the dust caused by the proposed drilling will not have a negative impact on rock painting sites situated more than 100 m from the 1 hectare well sites.

7.0 MITIGATION AND MANAGEMENT MEASURES

The following mitigation measures have been identified for the proposed project (Table 3).

Table 3: Environmental Management Plan for proposed South Western Karoo Basin Gas Exploration Application Project

Environmental Management Plan		Timeline and frequency	Responsible party	
<i>1. Cultural Heritage</i>				
1.1	Project activity:	Construction of access roads and well site preparation.	-	
	Impact:	Damage to heritage sites and features in the immediate environs of the site.	-	
	Mitigation measure(s):	During well site selection, no sites should be placed within 100 m of declared national and provincial heritage sites.	Site selection	Site selection team
		A site specific heritage impact assessment will need to be conducted to identify any heritage sites and features. <ul style="list-style-type: none"> ■ Areas identified for access road construction should be surveyed for heritage sites on the ground. ■ The one hectare well sites must be thoroughly surveyed (i.e. ground survey) for any heritage sites or features. 	As appropriate, before construction of access roads and well site preparation	Heritage practitioner
		Based on the findings of the assessment: <ul style="list-style-type: none"> ■ No access roads should be constructed within 20 m of identified heritage sites and features which are rated as sites of high local significance by the South African Heritage Resources Agency (SAHRA) (see Table 1); ■ No well sites should be constructed within 50 m of heritage sites and features which are rated as sites of high local significance by the SAHRA; and ■ No well sites or access roads should be constructed within 100 m of rock art sites which are rated as sites of high local significance by the SAHRA. 	As appropriate, to be determined prior to well site preparation and road construction and implemented throughout exploration	Drilling Contractor / SHEC
Mitigation measure(s):	Should heritage sites rated as sites of medium to high significance be located within the above-mentioned buffer zones in relation to the selected well sites, appropriate mitigation measures will need to be implemented, in consultation with the relevant heritage agency. Mitigation could entail rescue excavation, once a permit is granted by the SAHRA.	As appropriate, before construction of access roads and well site preparation	Heritage practitioner	

Environmental Management Plan		Timeline and frequency	Responsible party
	Should any archaeological or heritage features artefacts be uncovered during exploration, all activities must be stopped and an archaeologist accredited with the Association for Southern African Professional Archaeologist (ASAPA) approached in order to determine appropriate mitigation measures for the discovered finds, if necessary. Mitigation of heritage sites will be called for when they are rated as of medium to high significance. Mitigation could entail rescue excavation of relevant heritage sites - once a permit is granted for excavation by the SAHRA. If the relevant heritage sites include graves then the protocol provided in Section 36 of the National Heritage Resources Act, 1999 (Act 25 of 1999), regarding grave exhumation, will be followed.	If necessary, throughout exploration	Drilling Contractor / SHEC
	It is recommended that a heritage awareness guide be provided to the well site preparation personnel and drilling crew to help them identify heritage resources, should they be unearthed as a result of the exploration related activities.	As appropriate, prior to access road construction, well site preparation, drilling	SHEC

7.1 Recommended monitoring programmes

Sites situated closer than 200 m from the well sites and rated as significant and fragile should be monitored on a monthly basis until such time that exploration activities cease.

8.0 RECOMMENDATIONS FOR THE DETAILED IMPACT ASSESSMENT

Following the submission of the EMP, and a site selection process for the well sites, a detailed environmental impact assessment (EIA) will be undertaken.

8.1 Recommended site selection criteria

The following areas need to be avoided during site selection:

- Declared national and provincial heritage sites. Twenty Provincial Heritage sites occur in the Central Precinct. These are all historical sites that relate to the heritage of white colonists.

Prior to final site selection, a ground survey should be conducted. The following areas may contain heritage sites and should be considered during the undertaking of the ground survey:

- Rock shelters in the river valleys bisecting the mountain ranges will contain rock paintings and archaeological deposit.
- Dolerite outcrops and boulders may contain rock engravings. Karoo koppies consisting of dolerite boulders are promising candidates in this regard.
- Some rock engraving sites may occur on base rock adjacent to rivers or close to water sources.
- Scatters of Early, Middle and Later Stone age artefacts may also occur near fountains and water courses.
- Stone walling, including stone walled enclosures, related the Khoekhoen pastoralist activities in this area may also be found in the southern section of the Central Precinct.
- Old farmsteads, older than 60 years and hence of heritage significance, will occur on most farms in the area. We may anticipate that these may consist of farmhouses, sheds, outbuildings, kraals and other structures.
- The characteristic corbelled houses of the Great Karoo also occur in the Beaufort-West area. One of these has been declared a Provincial Heritage sites but all of them are protected by the NHRA.

- Various historical buildings will occur in the small towns in the area. These consist of houses, churches, and block houses.
- Graves belonging to both the indigenous San as well as colonial graveyards will occur on various farms and small towns in the area. These are typically indicated by stone heaps (as in the case with San graves) or formal and informal grave stones.
- Pans and watercourses. These features were a foci of human activity in the past and prehistoric and colonial-era heritage sites may be found near its environs.

8.2 Key questions to be addressed in the EIA

The following key questions will need to be addressed in the EIA:

- Are there any heritage resources or features located within or nearby (i.e. within 200 m) selected well sites and new access road alignments?
- If so, what is the significance of the heritage resource or feature (according to SAHRA rating and grading of sites)?
- Should heritage resources or features be rated as medium or high significance, what mitigation measures need to be implemented?

9.0 CONCLUSION

This preliminary Heritage Impact Assessment is based on a desktop survey of available literature and heritage databases. Only a few heritage surveys have been conducted in the Central Precinct and the available data is incomplete. Nevertheless, the available data indicate that heritage resources are varied and widely distributed in the study area. These include rock art sites, Stone Age sites and tool scatters, historical buildings associated with villages and farmsteads, graveyards, and potential cultural landscapes. Unfortunately the exact coordinates of the majority of these sites are not given in the existing data bases and a site specific ground survey will be required for those areas earmarked for gas drilling, once they have been identified.

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APPENDIX 1 RELOCATION OF GRAVES

Burial grounds and graves are dealt with in Article 36 of the NHR Act, no 25 of 1999. Below follows a broad summary of how to deal with grave in the event of proposed development.

- If the graves are younger than 60 years, an undertaker can be contracted to deal with the exhumation and reburial. This will include public participation, organising cemeteries, coffins, etc. They need permits and have their own requirements that must be adhered to.
- If the graves are older than 60 years old or of undetermined age, an archaeologist must be in attendance to assist with the exhumation and documentation of the graves. This is a requirement by law.

Once it has been decided to relocate particular graves, the following steps should be taken:

- Notices of the intention to relocate the graves need to be put up at the burial site for a period of 60 days. This should contain information where communities and family members can contact the developer/archaeologist/public-relations officer/undertaker. All information pertaining to the identification of the graves needs to be documented for the application of a SAHRA permit. The notices need to be in at least 3 languages, English, and two other languages. This is a requirement by law.
- Notices of the intention needs to be placed in at least two local newspapers and have the same information as the above point. This is a requirement by law.
- Local radio stations can also be used to try contact family members. This is not required by law, but is helpful in trying to contact family members.
- During this time (60 days) a suitable cemetery need to be identified close to the development area or otherwise one specified by the family of the deceased.
- An open day for family members should be arranged after the period of 60 days so that they can gather to discuss the way forward, and to sort out any problems. The developer needs to take the families requirements into account. This is a requirement by law.
- Once the 60 days has passed and all the information from the family members have been received, a permit can be requested from SAHRA. This is a requirement by law.
- Once the permit has been received, the graves may be exhumed and relocated.
- All headstones must be relocated with the graves as well as any items found in the grave

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