water & sanitation
Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

REPORT NO. : P WMA 12/T30/00/5314/12

Environmental Impact Assessment

for the proposed

MZIMVUBU WATER PROJECT

DEA Ref. No.: 14/12/16/3/3/2/677 (Dam construction)
14/12/16/3/3/2/678 (Electricity generation)
14/12/16/3/3/1/1169 (Roads)

PHASE 1 HERITAGE IMPACT ASSESSMENT

SEPTEMBER 2014

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ENVIRONMENTAL IMPACT ASSESSMENT FOR THE MZIMVUBU WATER PROJECT

Report Title:	***Phase 1 Heritage Impact Assessment***
Authors:	*Elizabeth Wahl and Len van Schalkwyk*
Project name:	***Environmental Impact Assessment for the Mzimvubu Water Project***
DWS Report Number:	*P WMA 12/T30/00/5314/12*
ILISO project reference number:	*1300113*
Status of report:	*Draft v.1.0*
First issue:	*September 2014*
Second issue:	
Final issue:	*Pending*

SPECIALIST: ***eTHEMBENI CULTURAL HERITAGE***

Approved for eThembeni Cultural Heritage by:

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DEPARTMENT OF WATER AND SANITATION – DIRECTORATE: OPTIONS ANALYSIS

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Chief Director: Integrated Water Resource Planning

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE MZIMVUBU WATER PROJECT

LIST OF REPORTS

REPORT TITLE	DWS REPORT NUMBER
Inception Report	P WMA 12/T30/00/5314/1
Scoping Report	P WMA 12/T30/00/5314/2
Environmental Impact Assessment Report	P WMA 12/T30/00/5314/3
Environmental Management Programme	P WMA 12/T30/00/5314/14
Water Use Licence Application Supporting Documents	P WMA 12/T30/00/5314/4
Ntabelanga Dam borrow pits and quarry Environmental Management Plan	P WMA 12/T30/00/5314/5
Lalini Dam borrow pits and quarry Environmental Management Plan	P WMA 12/T30/00/5314/6
SUPPORTING REPORTS	
Social Impact Assessment	P WMA 12/T30/00/5314/7
Economic Impact Assessment	P WMA 12/T30/00/5314/8
Visual Impact Assessment	P WMA 12/T30/00/5314/9
Floral Impact Assessment	P WMA 12/T30/00/5314/10
Faunal Impact Assessment	P WMA 12/T30/00/5314/11
Heritage Impact Assessment	**P WMA 12/T30/00/5314/12**
Water Quality Study	P WMA 12/T30/00/5314/13
Aquatic Ecology Assessment	P WMA 12/T30/00/5314/15
Wetland Assessment	P WMA 12/T30/00/5314/16

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE MZIMVUBU WATER PROJECT

DEA REF No. 14/12/16/3/3/2/677 (Dam construction application)
14/12/16/3/3/2/678 (Electricity generation application)
14/12/16/3/3/1/1169 (Roads application)

This report is to be referred to in bibliographies as:

Department of Water and Sanitation, South Africa (2014). ***Environmental Impact Assessment for the Mzimvubu Water Project: Phase 1 Heritage Impact Assessment Report***

DWS Report No: **P WMA 12/T30/00/5314/12**

Prepared for: Directorate – Options Analysis

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DECLARATION OF INDEPENDENCE

I, Len van Schalkwyk as authorised representative of eThembeni Cultural Heritage hereby confirm my independence as a specialist and declare that neither I nor eThembeni Cultural Heritage have any interest, be it business, financial, personal or other, in any proposed activity, application or appeal in respect of which eThembeni Cultural Heritage was appointed as heritage impact assessment specialists in terms of the National Environmental Management Act, 1998 (Act No. 107 of 1998), other than fair remuneration for worked performed, specifically in connection with the Heritage Impact Assessment for the Mzimvubu Water Project Environmental Impact Assessment. I further declare that I am confident in the results of the studies undertaken and conclusions drawn as a result of it – as is described in my attached report.

Signed: 

Date: 29 August 2014

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE MZIMVUBU WATER PROJECT

PHASE 1 HERITAGE IMPACT ASSESSMENT

Executive summary

Structures associated with unoccupied homesteads, ancestral graves and archaeological sites could be affected by inundation and appurtenant works associated with this project. The significance of impacts and recommended mitigation measures are summarised in the following table.

Places, buildings and structures	**Significance of impact**	**Mitigation measures**
Lalini Dam size 1 (preferred alternative), size 2 and size 3		
Without Mitigation	n/a	Not applicable
With Mitigation	n/a	
Ntabelanga Dam		
Without Mitigation	Low	Identification of abandoned homesteads and recording of field ownership. Structures such as livestock byres will require replacement. No further recording of abandoned homestead structures is required. A destruction permit is required from ECPHRA.
With Mitigation	Low	
Cumulative Impact Not applicable		
Ancestral graves	**Significance of impact**	**Mitigation measures**
Lalini Dam size 1 (preferred alternative), size 2 and size 3		
Without Mitigation	n/a	Not applicable
With Mitigation	n/a	
Ntabelanga Dam		
Without Mitigation	High	The locations of graves at abandoned homesteads must be ascertained. All graves within the full supply levels of the dam should be relocated. No new associated infrastructure may be located within 100 m of graves outside the full supply levels; if this distance cannot be maintained such graves may have to be relocated. All graves outside the full supply levels within 300 m of associated infrastructure should be demarcated, for the duration of construction.
With Mitigation	Low	
Cumulative Impact Not applicable		

Archaeological sites	Significance of impact	Mitigation measures
Lalini Dam size 1 (preferred alternative) , size 2 and size 3		
Without Mitigation	High	Site 1 should be mapped in detail before destruction. A detailed survey of potential Early Iron Age sites should be undertaken.
With Mitigation	Low	
Ntabelanga Dam		
Without Mitigation	High	Site 2 should be mapped and excavated/sampled before destruction. A detailed survey of potential Early Iron Age sites should be undertaken.
With Mitigation	Low	
Cumulative Impact Not applicable		

This Phase 1 HIA fulfils the requirements of Section 38(3) of the NHRA, subject to the limitations described in Section 5 of this report, in particular the fact that at the time of fieldwork only the data for the preferred full supply levels of the dams was available. Consequently we were unable to assess the impacts of appurtenant infrastructure. Fieldwork was further constrained by the presence of vegetation over a large part of the study area, especially where crops were standing in fields where Iron Age archaeological sites could be expected.

Accordingly, the recommendations of this HIA report are as follows:

Buildings and structures:

- Thorough identification of abandoned homesteads and recording of field ownership is required.
- Certain structures will require replacement so that the relevant family's socio-economic activities can continue.
- No further recording of abandoned homestead structures is required before destruction; they have been recorded sufficiently during this Phase 1 HIA.
- A destruction permit is required from ECPHRA; if possible a single permit should be obtained for all structures.

Graves and burial grounds:

- The locations of ancestral graves at abandoned homesteads must be ascertained.
- All graves within the full supply levels of the dam should be relocated, with the permission of the next-of-kin and a permit from ECPHRA.
- No new associated infrastructure may be located within 100 m of graves outside the full supply levels; if this distance cannot be maintained such graves may have to be relocated.
- All graves outside the full supply levels within 300 m of associated infrastructure should be demarcated by the Environmental Control Officer, in consultation with the next-of-kin, for the duration of construction.

Archaeological sites:

- Site 1 should be mapped in detail, with judicious sampling, authorised by a permit from ECPHRA. Thereafter the site may be destroyed once a destruction permit has been issued by ECPHRA.
- Site 2 should be mapped and excavated/sampled, authorised by a permit from ECPHRA. Thereafter the site may be destroyed once a destruction permit has been issued by ECPHRA.
- A detailed survey of potential Early Iron Age sites should be undertaken once crops have been harvested and vegetation clearance has occurred.

General:

- Fieldwork to identify heritage resources affected by roads and electrical infrastructure, and recommended mitigation measures, should be undertaken once final infrastructural locations and routes have been surveyed and pegged.

We recommend that this project proceed subject to the implementation of the recommended mitigation measures and have submitted this report to the Eastern Cape Provincial Heritage Resources Agency, ECPHRA, in fulfilment of the requirements of the National Heritage Resources Act.

If ECPHRA grants permission for the development to proceed, the client is reminded that the Act requires that a developer cease all work immediately and contact ECPHRA should any heritage resources, as defined in the Act, be discovered during the course of development activities.

ENVIRONMENTAL IMPACT ASSESSMENT FOR THE MZIMVUBU WATER PROJECT – PHASE 1 HERITAGE IMPACT ASSESSMENT

DEA REF No. 14/12/16/3/3/2/677 (Dam construction application)
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Acronyms and abbreviations

ASAPA	Association of Southern African Professional Archaeologists
BID	Background Information Document
DMs	District Municipalities
DWS	Department of Water and Sanitation
ECPHRA	Eastern Cape Provincial Heritage Resources Agency
EIA	Environmental Impact Assessment
HIA	Heritage Impact Assessment
KZNHA	KwaZulu-Natal Heritage Act 4 of 2008
NEMA	National Environmental Management Act 107 of 1998, as amended
NHRA	National Heritage Resources Act 25 of 1999, as amended
SAHRA	South African Heritage Resources Agency

List of units

MW	Mega Watt
m	Metres
m asl	Metres above sea level
km^2	Square Kilometres
ha	Hectare
°C	Degrees Celsius
%	Percentage

1. INTRODUCTION

1.1 BACKGROUND

The Department of Water and Sanitation (DWS) commissioned the Mzimvubu Water Project, an integrated multi-purpose (domestic water supply, agriculture, power generation, transport, tourism, conservation and industry) project, with the intention of providing a socio-economic development opportunity for the region.

Environmental authorisation is required for the infrastructure components of the project. The purpose of the Environmental Impact Assessment (EIA) is to assess the components of the project that are listed activities by the National Environmental Management Act (NEMA) for which the DWS has the mandate and intention to implement. The EIA process will provide the information that the environmental authorities require to decide whether the project should be authorised or not, and if so then under what conditions.

As part of this EIA process eThembeni Cultural Heritage (eThembeni) have been appointed to undertake a Heritage Impact Assessment (HIA).

1.2 PURPOSE OF THIS REPORT

A Phase 1 HIA typically includes primary research, such as fieldwork, as well as a literature and database review in an attempt to identify all heritage resources that might be affected by a proposed development and make recommendations for their management.

An HIA report, in compliance with NHRA Section 38(3), must include the following information:

- the identification and mapping of all heritage resources in the area affected;
- an assessment of the significance of such resources in terms of the heritage assessment criteria set out in regulations;
- an assessment of the impact of the development on such heritage resources;
- an evaluation of the impact of the development on heritage resources relative to the sustainable social and economic benefits to be derived from the development;
- the results of consultation with communities affected by the proposed development and other interested parties regarding the impact of the development on heritage resources;
- if heritage resources will be adversely affected by the proposed development, the consideration of alternatives; and
- plans for mitigation of any adverse effects during and after completion of the proposed development.

1.3 DETAILS AND EXPERTISE OF THE SPECIALIST

Len van Schalkwyk is accredited by the Cultural Resources Management section of the Association of Southern African Professional Archaeologists (ASAPA) to undertake HIAs in South Africa. Mr van Schalkwyk has a master's degree in archaeology (specialising in the history of early farmers in southern Africa) from the University of Cape Town and 25 years' experience in heritage management. He has worked on projects as diverse as the establishment of the Ondini Cultural Museum in Ulundi, the cultural management of Chobe National Park in Botswana and various archaeological excavations and oral history recording projects. He was part of the writing team that produced the KwaZulu-Natal Heritage Act 1997. He has worked with many rural communities to establish integrated heritage and land use plans and speaks good Zulu.

Mr van Schalkwyk left his position as assistant director of Amafa aKwaZulu-Natali, the KwaZulu-Natal provincial heritage management authority, to start eThembeni in partnership with Elizabeth Wahl, who was head of archaeology at Amafa at the time. Over the past decade they have undertaken almost 1000 HIAs throughout South Africa, as well as in Mozambique.

Elizabeth Wahl has a BA Honours in African Studies from the University of Cape Town, majoring in archaeology, and has completed various Masters courses in Heritage and Tourism at the University of KwaZulu-Natal. She is currently studying for an MPhil in the Conservation of the Built Environment at the University of Cape Town. She is also a member of ASAPA.

Ms Wahl was an excavator and logistical coordinator for Glasgow University Archaeological Research Division's heritage programme at Isandlwana Battlefield; has undertaken numerous rock painting surveys in the uKhahlamba/Drakensberg Mountains, northern KwaZulu-Natal, the Cederberg and the Koue Bokkeveld in the Cape Province; and was the principal excavator of Scorpion Shelter in the Cape Province, and Lenjane and Crystal Shelters in KwaZulu-Natal. Ms Wahl compiled the first cultural landscape management plan for the Mnweni Valley, northern uKhahlamba/Drakensberg, and undertook an assessment of and made recommendations for cultural heritage databases and organisational capacity in parts of Lesotho and South Africa for the Global Environment Facility of the World Bank for the Maloti Drakensberg Transfrontier Conservation and Development Area. She developed the first cultural heritage management plan for the uKhahlamba Drakensberg Park World Heritage Site, following UNESCO recommendations for rock art management in southern Africa.

2. PROJECT BACKGROUND SUMMARY

2.1 LOCALITY

The project footprint spreads over three District Municipalities (DMs) namely the Joe Gqabi DM in the north west, the OR Tambo DM in the south west and the Alfred Nzo DM in the east and north east.

The proposed Ntabelanga Dam site is located approximately 25 km east of the town of Maclear and north of the R396 Road. The proposed Lalini Dam site is situated approximately 17 km north east of the small town Tsolo. Both are situated on the Tsitsa River.

2.2 MAIN PROJECT COMPONENTS

Water Resource Infrastructure includes:

- A dam at the Ntabelanga site with a storage capacity of 490 million m^3;
- A dam at the Lalini site with a storage capacity of approximately 150 million m^3;
- A tunnel/conduit and power house at Lalini dam site for generating hydropower;
- Five new flow measuring weirs will be required in order to measure the flow that is entering and released from the dams. These flow gauging points will be important for monitoring the implementation of the Reserve and for operation of the dams.
- Wastewater treatment works at the dam sites;
- Accommodation for operations staff at the dam sites; and
- An information centre at each of the dam sites.

The Ntabelanga Dam will supply potable water to 539 000 people, which is estimated to increase to 730 000 people by year 2050. The domestic water supply infrastructure will include:

- A river intake structure and associated works;
- A regional water treatment works at Ntabelanga Dam;
- Potable bulk water distribution infrastructure for domestic and industrial water requirements (primary and secondary distribution lines);
- Bulk treated water storage reservoirs strategically located; and
- Pumping stations.

The Ntabelanga Dam will also provide water to irrigate approximately 2 900 ha. This project includes bulk water conveyance infrastructure for raw water supply to edge of field.

About 2 450 ha of the high potential land suitable for irrigated agriculture is in the Tsolo area and the rest near the proposed Ntabelanga Dam and along the river, close to the villages of Machibini, Nxotwe, Culunca, Ntshongweni, Caba, Kwatsha and Luxeni.

There will be a small hydropower plant at Ntabelanga Dam to generate between 0.75 MW and 5 MW (average 2.1 MW). This will comprise a raw water pipeline from the dam to a

building containing the hydropower turbines and associated equipment, and a discharge pipeline back to the river just below the dam wall. The impact is expected to be similar to that of a pumping station.

The hydropower plant at the proposed Lalini Dam and tunnel (used conjunctively with the Ntabelanga Dam) will generate an average output of 30 MW when operated as a base load power station and up to 150 MW when operated as a peaking power station. The power plant will require a tunnel/conduit of approximately 7 km linking the dam to the power plant downstream of the dam and below the gorge.

The high voltage power line to link the Lalini power station to the existing Eskom grid will be approximately 18.5 km and the power line linking Ntabelanga dam to the Eskom grid will be approximately 13 km. Power lines will also be constructed to supply power for construction at the two dam sites and for operating five pumping and booster stations along the bulk distribution infrastructure.

The area to be inundated by the dams will submerge some roads. Approximately 80 km of local roads will therefore be re-aligned. Additional local roads will also be upgraded to support social and economic development in the area. The road design will be very similar to the existing roads as well as be constructed using similar materials.

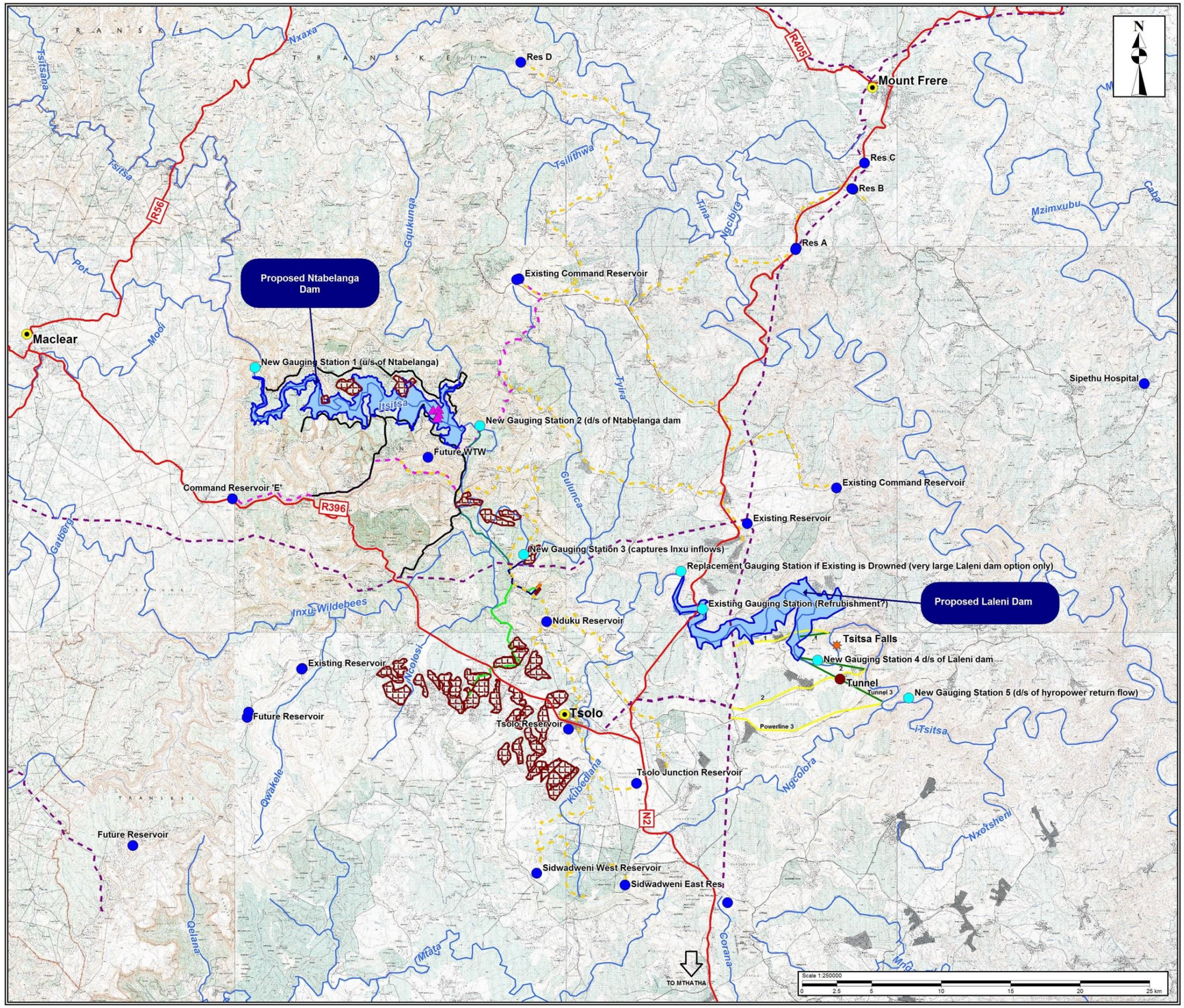
The project is expected to cost R 12.45 billion and an annual income of R 5.9 billion is expected to be generated by or as a result of the project during construction and R 1.6 billion per annum during operation. It will create 3 880 new skilled employment opportunities and 2 930 un-skilled employment opportunities during construction.

2.3 ALTERNATIVES

The following project level alternatives will be assessed:

- Three hydro power tunnel positions and associated power lines;
- Peak versus Base load power generation;
- Three different dam sizes for the Lalini Dam; and
- The no project option.

For the construction camps, pipeline routes and new roads, the specialist will identify any sensitive areas, and deviations to avoid these areas will be proposed in consultation with the technical team.



ENVIRONMENTAL IMAPCT ASSESSMENT FOR THE INFRASTRUCTURE COMPONENTS OF THE MZIBVUBU WATER PROJECT

NTABELANGA CONJUNCTIVE SCHEME

LOCALITY MAP

Legend

- Intermediate Raw Water Storage
- Tunnels
- Main Irrigation Gravity Line
- Power Transmission Lines
- Primary Lines
- Raw Water Pumping Main 3 From Dam
- Raw Water Pumping Main 4 From River
- Access Roads to be Upgraded
- Existing Powerlines
- Proposed Dams
- Irrigation Areas
- Reservoirs
- Gauging Stations
- Main Roads
- Secondary Lines
- Tsitsa Falls
- Tunnel
- Towns
- Borrow Pit Areas
- Rivers

ILISO consulting

water affairs
Department:
Water Affairs
REPUBLIC OF SOUTH AFRICA

DATE: 3 APRIL 2014

SYSTEM: HARTEBEESHOEK94

MAP BY: NDOMUPEI DHEMBA

Figure 1: Locality map

3. TERMS OF REFERENCE

3.1 SCOPE OF THE STUDY

This Phase 1 HIA includes primary research comprising fieldwork to identify landscape-scale and individual heritage issues and potential sites, and includes a literature and database review. The purpose of this assessment is to attempt to identify all heritage resources that might be affected by a proposed development and make recommendations for their management, in compliance with NHRA Section 38.

3.2 METHODOLOGY

3.2.1 Site survey

eThembeni staff members undertook fieldwork in July 2014 guided by international and local standards, including those provided in the sources listed in the bibliography. A two-person team traversed the study area on foot and in a vehicle, focusing on areas where heritage resources could be expected (excluding very steep slopes and rocky areas, for example). This controlled-exclusive surface survey is justified where 'sufficient information exists on an area to make solid and defensible assumptions and judgments about where [heritage resource] sites may and may not occur', and involves 'an inspection of the surface of the ground, wherever this surface is visible' (King 1978).

3.2.2 Database and literature review

We searched the SAHRIS database for cases relevant to the project area and surrounds, but located none. A concise account of the archaeology of the broader study area was compiled from sources including those listed in the bibliography.

3.2.3 Assessment of heritage resource value and significance

HIAs attempt to analyse a given geographic area as a landscape, in recognition that individual heritage resources are linked temporally and spatially to create a record of human settlement. Each resource is assigned a significance rating (low, medium, high), based on an assessment of its historic, scientific, aesthetic, architectural, social/cultural, spiritual and economic values, as appropriate. The value of a resource is further affected by its rarity, authenticity, integrity, condition and relationship to other heritage resources.

Heritage resources are significant only to the extent that they have public value, as recognised by the National Heritage Resources Act 25 of 1999 as amended (NHRA). Section 3(3) states that any place or object is to be considered part of the national estate if it has cultural significance or other special value because of:

- Its importance in the community, or pattern of South Africa's history;
- Its possession of uncommon, rare or endangered aspects of South Africa's natural or cultural heritage;

- Its potential to yield information that will contribute to an understanding of South Africa's natural or cultural heritage;
- Its importance in demonstrating the principal characteristics of a particular class of South Africa's natural or cultural places or objects;
- Its importance in exhibiting particular aesthetic characteristics valued by a community or cultural group;
- Its importance in demonstrating a high degree of creative or technical achievement at a particular period;
- Its strong or special association with a particular community or cultural group for social, cultural or spiritual reasons;
- 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
- Sites of significance relating to the history of slavery in South Africa.

A system for site grading was established by the NHRA and further developed by the South African Heritage Resources Agency (SAHRA 2007) and Heritage Western Cape (HWC 2007). This grading system (Table 1) has been approved by ASAPA for use in southern Africa and was utilised during this assessment.

Table 1: Site grading system.

Field rating	Grade	Significance	Recommended mitigation
National Significance	Grade 1	-	Conservation by SAHRA, national site nomination, mention any relevant international ranking. No alteration whatsoever without permit from SAHRA.
Provincial Significance	Grade 2	-	Conservation by provincial heritage authority, provincial site nomination. No alteration whatsoever without permit from provincial heritage authority.
Local Significance	Grade 3A	High significance	Conservation by local authority, no alteration whatsoever without permit from provincial heritage authority. Mitigation as part of development process not advised.
Local Significance	Grade 3B	High significance	Conservation by local authority, no external alteration without permit from provincial heritage authority. Could be mitigated and (part) retained as heritage register site.
4A	Generally Protected A	High/medium significance	Conservation by local authority. Site should be mitigated before destruction. Destruction permit required from provincial heritage authority.
4B	Generally Protected B	Medium significance	Conservation by local authority. Site should be recorded before destruction. Destruction permit required from provincial heritage authority.
4C	Generally Protected C	Low significance	Conservation by local authority. Site has been sufficiently recorded in the Phase 1 HIA. It requires no further recording before destruction. Destruction permit required from provincial heritage authority.

3.2.4 Impact criteria and rating scale

The heritage impacts are rated in accordance with the Environmental Impact Assessment Regulations, 2010 and the criteria drawn from the IEM Guidelines Series, Guideline 5: Assessment of Alternatives and Impacts, published by the DEAT, 2006 as well as the Guideline Document on Impact Significance (DEAT, 2002) as listed below.

The key issues identified during the Scoping Phase inform the terms of reference of this specialist study. Each issue consists of components that on their own or in combination with each other give rise to potential impacts, either positive or negative, from the project onto the environment or from the environment onto the project. The significance of the potential impacts is considered before and after identified mitigation is implemented, for direct, indirect, and cumulative impacts, in the short and long term.

A description of the nature of the impact, any specific legal requirements and the stage (construction/ decommissioning or operation) is given. Impacts are considered to be the same during construction and decommissioning.

The following criteria have been used to evaluate significance:

- **Nature:** This is an appraisal of the type of effect the activity is likely to have on the affected environment. The description includes what is being affected and how. The nature of the impact will be classified as positive or negative, and direct or indirect.

- **Extent and location:** This indicates the spatial area that may be affected (refer to Table 2).

Table 2: Geographical extent of impact

Rating	Extent	Description
1	Site	Impacted area is only at the site – the actual extent of the activity.
2	Local	Impacted area is limited to the site and its immediate surrounding area
3	Regional	Impacted area extends to the surrounding area, the immediate and the neighbouring properties.
4	Provincial	Impact considered of provincial importance
5	National	Impact considered of national importance – will affect entire country.

- **Duration:** This measures the lifetime of the impact (Table 3).

Table 3: Duration of Impact

Rating	Duration	Description
1	Short term	0 – 3 years, or length of construction period
2	Medium term	3 – 10 years
3	Long term	> 10 years, or entire operational life of project.
4	Permanent – mitigated	Mitigation measures of natural process will reduce impact – impact will remain after operational life of project.
5	Permanent – no mitigation	No mitigation measures of natural process will reduce impact after implementation – impact will remain after operational life of project.

- **Intensity/ severity:** This is the degree to which the project affects or changes the environment; it includes a measure of the reversibility of impacts (**Table** 4).

Table 4: Intensity of Impact

Rating	Intensity	Description
1	Negligible	Change is slight, often not noticeable, natural functioning of environment not affected.
2	Low	Natural functioning of environment is minimally affected. Natural, cultural and social functions and processes can be reversed to their original state.
3	Medium	Environment remarkably altered, still functions, if in modified way. Negative impacts cannot be fully reversed.
4	High	Cultural and social functions and processes disturbed – potentially ceasing to function temporarily.
5	Very high	Natural, cultural and social functions and processes permanently cease, and valued, important, sensitive or vulnerable systems or communities are substantially affected. Negative impacts cannot be reversed.

- **Potential for irreplaceable loss of resources:** This is the degree to which the project will cause loss of resources that are irreplaceable (Table 5).

Table 5: Potential for irreplaceable loss of resources

Rating	Potential for irreplaceable loss of resources	Description
1	Low	No irreplaceable resources will be impacted.
3	Medium	Resources can be replaced, with effort.
5	High	There is no potential for replacing a particular vulnerable resource that will be impacted.

- **Probability:** This is the likelihood or the chances that the impact will occur (**Table** 6).

Table 6: Probability of Impact

Rating	Probability	Description
1	Improbable	Under normal conditions, no impacts expected.
2	Low	The probability of the impact to occur is low due to its design or historic experience.
3	Medium	There is a distinct probability of the impact occurring.
4	High	It is most likely that the impact will occur
5	Definite	The impact will occur regardless of any prevention measures.

- **Confidence:** This is the level of knowledge or information available, the environmental impact practitioner or a specialist had in his/her judgement (refer to Table 7).

Table 7: Confidence in level of knowledge or information

Rating	Confidence	Description
1	Low	Judgement based on intuition, not knowledge / information.
2	Medium	Common sense and general knowledge informs decision.
3	High	Scientific / proven information informs decision.

- **Consequence:** This is calculated as extent + duration + intensity + potential impact on irreplaceable resources.

- **Significance:** The significance will be rated by combining the consequence of the impact and the probability of occurrence (i.e. consequence x probability = significance). The maximum value which can be obtained is 100 significance points (Table 8).

Table 8: Significance of issues (based on parameters)

Rating	Significance	Description
1-14	Very low	No action required.
15-29	Low	Impacts are within the acceptable range.
30-44	Medium-low	Impacts are within the acceptable range but should be mitigated to lower significance levels wherever possible.
45-59	Medium-high	Impacts are important and require attention; mitigation is required to reduce the negative impacts to acceptable levels.
60-80	High	Impacts are of great importance, mitigation is crucial.
81-100	Very high	Impacts are unacceptable.

- **Cumulative Impacts:** This refers to the combined, incremental effects of the impact. The possible cumulative impacts will also be considered.

- **Mitigation:** Mitigation for significant issues will be incorporated into the EMP.

4. LEGISLATION AND GUIDELINES CONSIDERED

4.1 GENERAL

The Constitution of the Republic of South Africa Act 108 of 1996 is the source of all legislation. Within the Constitution the Bill of Rights is fundamental, with the principle that the environment should be protected for present and future generations by preventing pollution, promoting conservation and practising ecologically sustainable development. With regard to spatial planning and related legislation at national and provincial levels the following legislation may be relevant:

- Physical Planning Act 125 of 1991
- Municipal Structures Act 117 of 1998
- Municipal Systems Act 32 of 2000
- Development Facilitation Act 67 of 1995

The identification, evaluation and management of heritage resources in the Eastern Cape Province is required and governed by the following legislation:

- National Environmental Management Act 107 of 1998
- National Heritage Resources Act 25 of 1999
- Minerals and Petroleum Resources Development Act 28 of 2002

4.2 NATIONAL HERITAGE RESOURCES ACT 25 OF 1999 (NHRA)

The NHRA established the South African Heritage Resources Agency (SAHRA) together with its Council to fulfil the following functions:

- Co-ordinate and promote the management of heritage resources at national level;
- Set norms and maintain essential national standards for the management of heritage resources in the Republic and to protect heritage resources of national significance;
- Control the export of nationally significant heritage objects and the import into the Republic of cultural property illegally exported from foreign countries;
- Enable the provinces to establish heritage authorities which must adopt powers to protect and manage certain categories of heritage resources; and
- Provide for the protection and management of conservation-worthy places and areas by local authorities.

SAHRA may devolve responsibility for heritage management to a provincial heritage resources authority. In the Eastern Cape Province the responsible organisation is the Eastern Cape Provincial Heritage Resources Authority, ECPHRA.

4.3 HERITAGE IMPACT ASSESSMENTS (HIAS)

Section 38(1) of the NHRA may require an HIA in case of:

- The construction of a road, wall, power line, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;
- The construction of a bridge or similar structure exceeding 50 m in length;
- Any development or other activity which will change the character of a site:
  (i) exceeding 5 000 m² in extent; or
  (ii) involving three or more existing erven or subdivisions thereof; or
  (iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or
  (iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;
- The re-zoning of a site exceeding 10 000 m² in extent; or
- Any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.

It is incumbent upon the developer or Environmental Practitioner to approach SAHRA to ascertain whether an HIA is required for a project; what categories of heritage resource must be assessed; and request a detailed motivation for such a study in terms of both the nature of the development and the nature of the environment. The Environmental Practitioner may also submit information to the heritage authority in substantiation of exemption from a specific assessment due to existing environmental disturbance, for example.

4.4 PRINCIPLES FOR HERITAGE RESOURCES MANAGEMENT

The NHRA stipulates the following general principles for heritage resources management:

1(a) Heritage resources have lasting value in their own right and provide evidence of the origins of South African society and as they are valuable, finite, non-renewable and irreplaceable they must be carefully managed to ensure their survival;
(b) Every generation has a moral responsibility to act as trustee of the national heritage for succeeding generations and the State has an obligation to manage heritage resources in the interests of all South Africans;

(c) Heritage resources have the capacity to promote reconciliation, understanding and respect, and contribute to the development of a unifying South African identity; and
(d) Heritage resources management must guard against the use of heritage for sectarian purposes or political gain.

2. To ensure that heritage resources are effectively managed:
(a) The skills and capacities of persons and communities involved in heritage resources management must be developed; and
(b) Provision must be made for the on-going education and training of existing and new heritage resources management workers.
3. Laws, procedures and administrative practices must:
(a) Be clear and generally available to those affected thereby;
(b) In addition to serving as regulatory measures, also provide guidance and information to those affected thereby; and
(c) Give further content to the fundamental rights set out in the Constitution.

4. Heritage resources form an important part of the history and beliefs of communities and must be managed in a way that acknowledges the right of affected communities to be consulted, and to participate in their management.

5. Heritage resources contribute significantly to research, education and tourism and they must be developed and presented for these purposes in a way that ensures dignity and respect for cultural values.

6. Policy, administrative practice and legislation must promote the integration of heritage resources conservation in urban and rural planning and social and economic development.

7. The identification, assessment and management of the heritage resources of South Africa must:
(a) Take account of all relevant cultural values and indigenous knowledge systems;
(b) Take account of material or cultural heritage value and involve the least possible alteration or loss of it;
(c) Promote the use and enjoyment of and access to heritage resources, in a way consistent with their cultural significance and conservation needs;
(d) Contribute to social and economic development;
(e) Safeguard the options of present and future generations; and
(f) Be fully researched, documented and recorded.

4.5 DEFINITIONS OF HERITAGE RESOURCES

The NHRA defines a heritage resource as any place or object of cultural significance i.e. of aesthetic, architectural, historical, scientific, social, spiritual, linguistic or technological value or significance. This includes, but is not limited to, the following wide range of places and objects:

- Living heritage as defined in the National Heritage Council Act 11 of 1999 (cultural tradition; oral history; performance; ritual; popular memory; skills and techniques; indigenous knowledge systems; and the holistic approach to nature, society and social relationships);
- Places, buildings, structures and equipment;
- Places to which oral traditions are attached or which are associated with living heritage;
- Historical settlements and townscapes;
- Landscapes and natural features;
- Geological sites of scientific or cultural importance;
- Archaeological and palaeontological sites;
- Graves and burial grounds;
- Public monuments and memorials;
- Sites of significance relating to the history of slavery in South Africa;
- Movable objects, but excluding any object made by a living person; and
- Battlefields.

4.6 PERMIT REQUIREMENTS

4.6.1 Structures

No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

4.6.2 Archaeological and palaeontological sites and meteorites

No person may, without a permit issued by SAHRA:

- Destroy, damage, excavate, alter, deface or otherwise disturb any archaeological or palaeontological site or any meteorite
- Destroy, damage, excavate, remove from its original position, collect or own any archaeological or palaeontological material or object or any meteorite

- Trade in, sell for private gain, export or attempt to export from South Africa any category of archaeological or palaeontological material or object, or any meteorite
- Bring onto or use at an archaeological or palaeontological site any excavation equipment or any equipment which assist in the detection or recovery of metals or archaeological and palaeontological material or objects, or use such equipment for the recovery of meteorites.

4.6.3 Graves and burial grounds

No person may damage, alter, exhume, or remove from its original position any grave, as defined in the NHRA, without permission from SAHRA. SAHRA may not issue a permit for any alteration to or disinterment or reburial of a grave unless it is satisfied that the applicant has, in accordance with regulations made by SAHRA:

- Made a concerted effort to contact and consult communities and individuals who by tradition have an interest in such grave or burial ground; and
- Reached agreements with such communities and individuals regarding the future of such grave or burial ground.

Any person who in the course of development or any other activity discovers the location of a grave, the existence of which was previously unknown, must immediately cease such activity and report the discovery to SAHRA which must, in co-operation with the South African Police Services and in accordance with regulations of SAHRA:

- Carry out an investigation for the purpose of obtaining information on whether or not such grave is protected in terms of the NHRA or is of significance to any community; and
- If such grave is protected or is of significance, assist any person who or community which is a direct descendant to make arrangements for the exhumation and re-interment of the contents of such grave or, in the absence of such person or community, make any such arrangements as it deems fit.

5. ASSUMPTIONS AND LIMITATIONS

The assumptions and limitations of this HIA are as follows:

- The description of the proposed project, provided by the client, is accurate.
- At the time of fieldwork only the data for the preferred full supply levels of the dams was available. Consequently we were unable to assess the impacts of appurtenant infrastructure, and have recommended that such assessment take place once the necessary surveys are complete.
- Fieldwork was constrained by the presence of vegetation over a large part of the study area, especially where crops were standing in fields where Iron Age archaeological sites could be expected. In such areas staff members focused on exposed soil surfaces in tracks and paths.
- Soil surface visibility was non-existent to moderate. Heritage resources might be present below the surface or in areas of dense vegetation and we remind the client that the NHRA requires that a developer cease all work immediately and notify SAHRA should any heritage resources, as defined in the Act, be discovered during the course of development activities.
- No subsurface investigation (including excavations or sampling) were undertaken, since a permit from SAHRA is required to disturb a heritage resource.
- A key concept in the management of heritage resources is that of non-renewability: damage to or destruction of most resources, including that caused by bona fide research endeavours, cannot be reversed or undone. Accordingly, management recommendations for heritage resources in the context of development are as conservative as possible, according to the precautionary principle.
- Human sciences are necessarily both subjective and objective in nature. eThembeni strives to manage heritage resources to the highest standards in accordance with national and international best practice, but recognise that our opinions might differ from those of other heritage practitioners.
- Staff members involved in this project have no vested interest in it; are qualified to undertake the tasks as described in the terms of reference; and comply at all times with the Codes of Ethics and Conduct of ASAPA.
- eThembeni staff members take no personal or professional responsibility for the misuse of the information contained in this report, although they take all reasonable precautions against such misuse.

6. DESCRIPTION OF THE AFFECTED ENVIRONMENT

In archaeological terms South Africa's prehistory has been divided into a series of phases based on broad patterns of technology. The primary distinction is between a reliance on chipped and flaked stone implements (the Stone Age), the ability to work iron (the Iron Age) and the Colonial Period, characterised by the advent of writing and in southern Africa primarily associated with the first European travellers (Mitchell 2002). Spanning a large proportion of human history, the Stone Age in Southern Africa is further divided into the Early Stone Age, or Palaeolithic Period (about 2 500 000–150 000 years ago), the Middle Stone Age, or Mesolithic Period (about 500 000–30 000 years ago), and the Late Stone Age, or Neolithic Period (about 30 000–2 000 years ago). The simple stone tools found with australopithecine fossil bones fall into the earliest part of the Early Stone Age.

6.1 THE STONE AGE

6.1.1 Early Stone Age

Most Early Stone Age sites in South Africa can probably be connected with the hominin species known as *Homo erectus*. Simply modified stones, hand axes, scraping tools, and other bifacial artifacts had a wide variety of purposes, including butchering animal carcasses, scraping hides, and digging for plant foods. Most South African archaeological sites from this period are the remains of open camps, often by the sides of rivers and lakes, although some are rock shelters, such as Montagu Cave in the Cape region.

In the study area sites or occurrences belonging to this period usually comprise surface scatters and individual stone tools, often located close to water. They seldom have more than low heritage significance at all levels for their scientific value, since they occur out of context and in association with no other archaeological debris. Mitigation is typically limited to recording their location if they occur in sufficient concentrations to constitute an archaeological site.

6.1.2 Middle Stone Age

The long episode of cultural and physical evolution gave way to a period of more rapid change about 120 000 years ago. Hand axes and large bifacial stone tools were replaced by stone flakes and blades that were fashioned into scrapers, spear points, and parts for hafted, composite implements. This technological stage, now known as the Middle Stone Age, is represented by numerous sites in South Africa.

Open camps and rock overhangs were used for shelter. Day-to-day debris has survived to provide some evidence of early ways of life, although plant foods have rarely been preserved. Middle Stone Age bands hunted medium-sized and large

prey, including antelope and zebra, although they tended to avoid the largest and most dangerous animals, such as the elephant and the rhinoceros. They also ate seabirds and marine mammals that could be found along the shore and sometimes collected tortoises and ostrich eggs in large quantities.

The Middle Stone Age is perhaps most significant as the time period during which the first modern humans, *Homo sapiens sapiens*, emerged between 120 000 and 30 000 years ago. The Klasies River cave complex, located on the southern Cape coast contains the oldest remains of anatomically modern humans in the world, dating to around 110 000 years ago (Singer & Wymer 1982; Rightmire & Deacon 1991). Humans were anatomically modern by 110 000 years ago but only developed into culturally modern behaving humans between 80 000 and 70 000 years ago, during cultural phases known as the Still Bay and Howieson's Poort time periods or stone tool traditions.

In the study area Middle Stone Age sites or occurrences usually comprise surface scatters and individual stone tools. Like their Early Stone Age counterparts they seldom have more than low heritage significance at all levels for their scientific value, since they occur out of context and in association with no other archaeological debris. Mitigation is typically limited to recording their location if they occur in sufficient concentrations to constitute an archaeological site.

6.1.3 Later Stone Age

Basic tool-making techniques began to undergo additional change about 40 000 years ago. Small finely worked stone implements known as microliths became more common, while the heavier scrapers and points of the Middle Stone Age appeared less frequently. Archaeologists refer to this technological stage as the Later Stone Age or LSA, which can be divided into four broad temporal units directly associated with climatic, technological and subsistence changes (Deacon 1984):

1. Late Pleistocene microlithic assemblages (40-12 000 years ago);
2. Terminal Pleistocene / early Holocene non-microlithic (macrolithic) assemblages (12-8 000 years ago);
3. Holocene microlithic assemblages (8 000 years ago to the Colonial Period); and
4. Holocene assemblages with pottery (2 000 years ago to the Historic Period) closely associated with the arrival of pastoralist communities into South Africa (Mitchell 1997; 2002).

Animals were trapped and hunted with spears and arrows on which were mounted well-crafted stone blades. Bands moved with the seasons as they followed game into higher lands in the spring and early summer months, when plant foods could also be found. When available, rock overhangs became shelters; otherwise, windbreaks were built. Shellfish, crayfish, seals, and seabirds were also important sources of food, as were fish caught on lines, with spears, in traps, and possibly with nets.

Elements of material culture characteristic of the LSA that reflect cultural modernity have been summarised as follows (Deacon 1984):

- Symbolic and representational art (paintings and engravings);
- Items of personal adornment such as decorated ostrich eggshell, decorated bone tools and beads, pendants and amulets of ostrich eggshell, marine and freshwater shells;
- Specialized hunting and fishing equipment in the form of bows and arrows, fish hooks and sinkers;
- A greater variety of specialized tools including bone needles and awls and bone skin-working tools;
- Specialized food gathering tools and containers such as bored stone digging stick weights, carrying bags of leather and netting, ostrich eggshell water containers, tortoiseshell bowls and scoops and later pottery and stone bowls;
- Formal burial of the dead in graves, sometimes covered with painted stones or grindstones and accompanied by grave goods;
- The miniaturization of selected stone tools linked to the practice of hafting for composite tools production; and
- A characteristic range of specialized tools designed for making some of the items listed above.

Thousands of Later Stone Age archaeological sites occur in and close to the Maloti Drakensberg Mountains, ranging from open air surface stone artefact scatters to rock shelters with spectacular paintings, mainly attributable to hunter-gatherers. Such sites obviously range across the whole spectrum of heritage significance. Mitigation of highly significant sites might include specialized archaeological excavations, and the presence of a significant rock painting site might require relocation or modification of a development activity.

The introduction of pastoralism to southern Africa around 2 000 years ago had a profound effect on the subcontinent. Some researchers believe that pastoralism followed mixed farming[1] (rainfall-dependent agriculture with animal husbandry), with the introduction of irrigation to farming resulting in the selective pressures for specialization (Lees & Bates 1973). The increased productivity of irrigation

[1] http://en.wikipedia.org/wiki/Pastoralist

agriculture ultimately resulted in population growth and pressure on resources, which lead to greater land and greater labour requirements for intensive farming. Marginal areas of land were often all that was left for animal rearing. To acquire enough forage, large distances had to be covered by herds. This resulted in a higher labour requirement for animal tending. As a result of the increasing requirements of both intensive agriculture and pastoralism, the two practices diverged and specialization took place. Both developed alongside each other, with continuing interactions (Lees & Bates 1974). Other proponents of this view include Levy (1983) and Hole (1996).
Another theory is that pastoralism derived directly from hunting and gathering. In this view, hunters of wild goats and sheep already had knowledge of herd dynamics and the ecological needs of the herd animals. These groups were already mobile, and followed wild herds on their seasonal round. The process of domestication began before the first wild goat or sheep was tamed as a result of the selective pressure of hunter prey-choice acting upon the herd. In this way, wild herds were selected to become more manageable for the proto-pastoralist nomadic hunter and gatherer groups.

Pastoralism takes place mainly in marginal areas, where cultivation (and the higher energy achieved per area) is not possible. Animals feed on the forage of these lands; an energy source which humans cannot directly utilize. The herds convert the energy into sources available for human consumption: milk, blood and sometimes meat (Bates 1998). A common conception that pastoralists exist at basic subsistence levels is not true; groups often accumulate wealth and can be involved in international trade. Complex exchange relationships exist with horticulturalists, agriculturalists and other groups; pastoralists rarely exist exclusively with the products of their herd.

Scientists from Stanford University claim to have used the principle of genetic and cultural exchange to find the first genetic evidence of a prehistoric migration of people from Tanzania to southern Africa[2]. Archaeologists currently favour a model in which the cultural practice of pastoralism spread from an unknown eastern African group into southern Africa about 2 000 years ago, perhaps without any sort of movement of people (i.e. genetic exchange). The Stanford genetic study, while still supporting the archaeological record for the timing and place of the origins of pastoralism in sub-Saharan Africa, suggests that a small group of men actually migrated into southern Africa about 2 000 years ago. These men probably married into local hunter-gatherer populations, contributing their livestock and cultural knowledge of pastoralism. These migrants were probably closely related to the modern day Datog and Burunge groups of Tanzania.

[2] http://spittoon.23andme.com/2008/08/04/the-origins-of-pastoralism-in-africa-what-do-the-genes-say/

A shift to pastoralism was a fundamental change for the hunter-gatherers of southern Africa during the last 2 000 years. It caused a dramatic change in the culture and belief systems of these people. As pastoralism became more widespread in southern Africa, so did the beginnings of a sense of ownership of animals and the emergence of chieftains. These changes can still be seen today in the practices of people throughout Namibia, Botswana and South Africa. For example, the Nama of Namibia began practicing pastoralism not long after its arrival in southern Africa and continue to do so today.

Archaeological excavations at Blombos Cave in the southern Cape of South Africa suggest a chronological linkage between the introduction of sheep and pottery in the region (Henshilwood 1996). Direct dates for sheep bones found in the cave indicate that these animals were brought to the southernmost Cape around 2 000 years ago. There is also strong evidence of the presence of pottery in the area at around the same period. However, it is not clear whether or not sheep and pottery were brought to the Cape as a 'package.'

Southern African pastoralist sites are notoriously difficult to identify, since the herders' temporary encampments typically left few traces.

6.2 IRON AGE[3]

Archaeological evidence shows that Bantu-speaking agriculturists first settled in southern Africa around AD 300. Bantu-speakers originated in the vicinity of modem Cameroon from where they began to move eastwards and southwards, some time after 400 BC, skirting around the equatorial forest. An extremely rapid spread throughout much of sub-equatorial Africa followed: dating shows that the earliest communities in Tanzania and South Africa are separated in time by only 200 years, despite the 3 000 km distance between the two regions. It seems likely that the speed of the spread was a consequence of agriculturists deliberately seeking iron ore sources and particular combinations of soil and climate suitable for the cultivation of their crops.

The earliest agricultural sites in KwaZulu-Natal date to between AD 400 and 550. All are situated close to sources of iron ore, and within 15 km of the coast. Current evidence suggests it may have been too dry further inland at this time for successful cultivation. From AD 650 onwards, however, climatic conditions improved and agriculturists expanded into the valleys of KwaZulu-Natal, where they settled close to

[3] Summarised from Whitelaw 1991, 1997, 2009.

rivers in savanna or bushveld environments. There is a considerable body of information available about these early agriculturists.

Seed remains show that they cultivated finger millet, bulrush millet, sorghum and probably the African melon. It seems likely that they also planted African groundnuts and cowpeas, though direct evidence for these plants is lacking from the earlier periods. Faunal remains indicate that they kept sheep, cattle, goats, chickens and dogs, with cattle and sheep providing most of the meat. Men hunted, perhaps with dogs, but hunted animals made only a limited contribution to the diet in the region.
Metal production was a key activity since it provided the tools of cultivation and hunting. The evidence indicates that people who worked metal lived in almost every village, even those that were considerable distances from ore sources.

Large-scale excavations in recent years have provided data indicating that first-millennium agriculturist society was patrilineal and that men used cattle as bridewealth in exchange for wives. On a political level, society was organised into chiefdoms that, in our region, may have had up to three hierarchical levels. The villages of chiefs tended to be larger than others, with several livestock enclosures, and some were occupied continuously for lengthy periods. Social forces of the time resulted in the concentration of unusual items on these sites. These include artefacts that originated from great distances, ivory items (which as early as AD 700 appear to have been a symbol of chieftainship), and initiation paraphernalia.

This particular way of life came to an end around AD 1000, for reasons not yet fully understood. There was a radical change in the decorative style of agriculturist ceramics at this time, while the preferred village locations of the last four centuries were abandoned in favour of sites along the coastal littoral. In general, sites dating to between 1050 and 1250 are smaller than most earlier agriculturist settlements. It is tempting to see in this change the origin of the Nguni settlement pattern. Indeed, some archaeologists have suggested that the changes were a result of the movement into the region of people who were directly ancestral to the Nguni-speakers of today. Others prefer to see the change as the product of social and cultural restructuring within resident agriculturist communities.

Whatever the case, it seems likely that this new pattern of settlement was in some way influenced by a changing climate, for there is evidence of increasing aridity from about AD 900. A new pattern of economic inter-dependence evolved that is substantially different from that of earlier centuries, and is one that continued into the colonial period nearly 500 years later.

Around 2 000 Iron Age sites have been identified in the Maloti Drakensberg region, with most occurring at altitudes below 1 800 metres. In and around the study area the distribution and altitude of Early Iron Age sites ‘indicate that they are confined to

localities in deeply incised river valleys (as predicted from the pattern in KwaZulu-Natal), but at decreasing distances from the sea and declining altitudes in a south westerly direction across the Eastern Cape. This might reflect the operation of a human rather than a physical geographical factor. One possibility is the early presence of Khoekhoen herders, perhaps with seasonal camps along rivers, westward of about 29°E. The distribution of a) rivers with names derived from Khoekhoen, b) isiXhosa dialects with a strong Khoekhoen component, and c) herder pottery along the coastline, all strongly support this proposal' (Feely and Bell-Cross 2011: 105[4]).

6.3 COLONIAL RULE[5]

By the closing decades of the 18th century, South Africa had fallen into two broad regions: west and east. Colonial settlement dominated the west, including the winter rainfall region around the Cape of Good Hope, the coastal hinterland northward toward the present-day border with Namibia, and the dry lands of the interior. Trekboers took increasingly more land from the Khoekhoe and from remnant hunter-gatherer communities, who were killed, were forced into marginal areas, or became labourers tied to the farms of their new overlords. Indigenous farmers controlled both the coastal and valley lowlands and the Highveld of the interior in the east, where summer rainfall and good grazing made mixed farming economies possible.

A large group of British settlers arrived in the eastern Cape in 1820; this, together with a high European birth rate and wasteful land usage, produced an acute land shortage, which was alleviated only when the British acquired more land through massive military intervention against Africans on the eastern frontier. Until the 1840s the British vision of the colony did not include African citizens (referred to pejoratively by the British as "Kaffirs"), so, as Africans lost their land, they were expelled across the Great Fish River, the unilaterally proclaimed eastern border of the colony.

The first step in this process included attacks in 1811–12 by the British army on the Xhosa groups, the Gqunukhwebe and Ndlambe. An attack by the Rharhabe-Xhosa on Graham's Town in 1819 provided the pretext for the annexation of more African territory, to the Keiskamma River. Various Rharhabe-Xhosa groups were driven from their lands throughout the early 1830s. They counterattacked in December 1834, and Governor Benjamin D'Urban ordered a major invasion the following year, during which thousands of Rharhabe-Xhosa died. The British crossed the Great Kei River and ravaged territory of the Gcaleka-Xhosa as well; the Gcaleka chief, Hintsa, invited to hold discussions with British military officials, was held hostage and died trying to

[4] See also Feely (1985, 1987); Granger et al (1985); Prins (1996); Prins &Granger (1993).
[5] http://www.britannica.com; article authored by Colin J. Bundy, Julian R. D. Cobbing, Martin Hall and Leonard Monteath Thompson.

escape. The British colonial secretary, Lord Glenelg, who disapproved of D'Urban's policy, halted the seizure of all African land east of the Great Kei. D'Urban's initial attempt to rule conquered Africans with European magistrates and soldiers was overturned by Glenelg; instead, for a time, Africans east of the Keiskamma retained their autonomy and dealt with the colony through diplomatic agents.

However, after further fighting with the Rharhabe-Xhosa on the eastern frontier in 1846, Governor Colonel Harry Smith finally annexed, over the next two years, not only the region between the Great Fish and the Great Kei rivers (establishing British Kaffraria) but also a large area between the Orange and Vaal rivers, thus establishing the Orange River Sovereignty. These moves provoked further warfare in 1851–53 with the Xhosa (joined once more by many Khoe), with a few British politicians ineffectively trying to influence events.

Between 1811 and 1858 colonial aggression deprived Africans of most of their land between the Sundays and Great Kei Rivers and produced poverty and despair. From the mid-1850s British magistrates held political power in British Kaffraria, destroying the power of the Xhosa chiefs. Following a severe lung sickness epidemic among their cattle in 1854–56, the Xhosa killed many of their remaining cattle and in 1857–58 grew few crops in response to a millenarian prophecy that this would cause their ancestors to rise from the dead and destroy the whites. Many thousands of Xhosa starved to death, and large numbers of survivors were driven into the Cape Colony to work. British Kaffraria fused with the Cape Colony in 1865, and thousands of Africans newly defined as Fingo resettled east of the Great Kei, thereby creating Fingoland. The Transkei, as this region came to be known, consisted of the hilly country between the Cape and Natal. It became a large African reserve and grew in size when those parts that were still independent were annexed in the 1880s and 90s (Pondoland lost its independence in 1894).

Under apartheid blacks were treated like 'tribal' people and were required to live on reserves under hereditary chiefs except when they worked temporarily in white towns or on white farms. The government began to consolidate the scattered reserves into eight (eventually ten) distinct territories, designating each of them as the 'homeland', or Bantustan, of a specific black ethnic community. The government manipulated homeland politics so that compliant chiefs controlled the administrations of most of those territories. Arguing that Bantustans matched the decolonization process then taking place in tropical Africa, the government devolved powers onto those administrations and eventually encouraged them to become 'independent'. Between 1976 and 1981 four accepted independence—Transkei, Bophuthatswana, Venda, and Ciskei—though none was ever recognized by a foreign government. Like the other homelands, however, they were economic backwaters, dependent on subsidies from Pretoria.

Conditions in the homelands continued to deteriorate, partly because they had to accommodate vast numbers of people with minimal resources. Many people found their way to the towns; but the government, attempting to reverse this flood, strengthened the pass laws by making it illegal for blacks to be in a town for more than 72 hours at a time without a job in a white home or business. A particularly brutal series of forced removals were conducted from the 1960s to the early 80s, in which more than 3.5 million black people were taken from towns and white rural areas (including lands they had occupied for generations) and dumped into the reserves, sometimes in the middle of winter and without any facilities.

In 1950 the Government appointed a commission under the Chairmanship of Professor F. R. Tomlinson, charged with the task of devising a "comprehensive scheme for the rehabilitation of the Native Areas with a view to developing within them a social structure in keeping with the culture of the Native and based upon effective socio-economic planning."[6]

The study area was subject to 'betterment' schemes as a result of implementation of recommendations of the Tomlinson Commission, which resulted in scattered rural homesteads being abandoned and people moving into nuclear villages (*lalini*). The agrarian landscape was partitioned into fenced grazing camps and contour ploughed arable lands, the latter being apportioned to heads of households by the traditional authority structures. Grazing lands remained communal but attempts were made by means of fenced camps to implement rotational grazing and other veld management options. Rotational grazing is, to all intents and purposes, no longer functional. However, grazing and rangelands retain a value, with allocated fields, even if appearing disused or long fallow, remain in folk memory as "owned".

Numerous abandoned homesteads that probably predate the mid 1960s are present in the study area. These homesteads may well be the locations of ancestral graves.

[6] Article by D Hobart Houghton http://www.disa.ukzn.ac.za/webpages/DC/asjan57.4/asjan57.4.pdf

7. IMPACT ASSESSMENT FOR DAMS AND ASSOCIATED WATER INFRASTRUCTURE

This Chapter presents the findings of the environmental impact assessment for the dams and associated activities (DEA Ref no. 14/12/16/3/3/2/677).

The activities assessed under this chapter are listed below:

- The Ntabelanga and Lalini Dams;
- Five flow gauging weirs;
- Primary and secondary bulk potable water infrastructure:
    - Primary infrastructure: main water treatment works, including four major treated water pumping stations and three minor treated water pumping stations, main bulk treated water rising mains, and eight Command Reservoirs that will supply the whole region;
    - Secondary distribution lines conveying bulk treated water from Command Reservoirs to existing and new District Reservoirs;
- Bulk raw water conveyance infrastructure (abstraction, pipelines, one raw water pumping station, one reservoir and two booster pumping stations) for irrigated agriculture (raw water supply up to field edge);
- Impact of commercial agriculture in earmarked irrigation areas;
- WWTWs at the Ntabelanga and Lalini Dam sites;
- Accommodation for operational staff at the Ntabelanga and Lalini Dam sites;
- Eight construction materials quarries and borrow pits;
- River intake structures and associated works;
- Information centres at the two dam sites; and
- Miscellaneous construction camps, lay-down areas, and storage sites.

7.1 CONSTRUCTION AND DECOMMISSIONING PHASES

No development activities associated with the proposed project had begun at the time of our visit. Table 9 summarises the heritage resource types assessed, and our observations.

Table 9: Heritage resource types assessed

Heritage resource type	Observation
Places, buildings and structures	See below
Places associated with oral traditions or living heritage	None were identified within proposed development area.
Landscapes	None were identified within proposed development area.
Natural features	None were identified within proposed development area.
Graves and burial grounds	See below
Ecofacts	None were identified within proposed development area.
Geological sites of scientific or cultural importance	None were identified within proposed development area.
Archaeological sites	See below
Palaeontological sites	See below
Historical settlements and townscapes	None were identified within proposed development area.
Public monuments and memorials	None were identified within proposed development area.
Battlefields	None were identified within proposed development area.

7.1.1 Places, buildings and structures

A **place** is defined as:

- A site, area or region;
- A building or other structure which may include equipment, furniture, fittings and articles associated with or connected with such building or other structure;
- A group of buildings or other structures which may include equipment, furniture, fittings and articles associated with or connected with such group of buildings or other structures;
- An open space, including a public square, street or park; and
- In relation to the management of a place, includes the immediate surroundings of a place.

Structure means any building, works, device or other facility made by people and which is fixed to land, and includes any associated fixtures, fittings and equipment. No person may alter or demolish any structure or part of a structure which is older than 60 years without a permit issued by the relevant provincial heritage resources authority.

Structures associated with unoccupied homesteads, many presumably abandoned as a result of the implementation of the recommendations of the Tomlinson Commission and the formation of nuclear villages, are located within the proposed Ntabelanga Dam basin (**Table 10**). None were identified within the proposed Lalini Dam basin. For the purposes of this report all these structures are assumed to be older than sixty years, thus constituting heritage resources. All of these structures have low significance, with a field rating of 4C and Grade Generally Protected C.

Table 10: Structures located within proposed Ntabelanga Dam basin

Ntabelanga Dam Basin			
Structure	**Location relative to FSL**	**S**	**E**
1 Stone walled stock pen	6 m above FSL	31 05.308	28 31.337
2 Stone walled stock pen	10 m above FSL	31 05.376	28 31.345
3 Livestock byre extant	951 m asl. Within FSL	31 05.536	28 31.300
4 Abandoned homestead site possibly > 60 years	937 m asl. Within FSL	31 05.204	28 33.363
5 Abandoned homestead site possibly > 60 years	939 m asl. Within FSL	31 05.174	28 33.523
6 Abandoned homestead site possibly > 60 years	938 m asl. Within FSL	31 05.379	28 33.732

All places, buildings and structures within the full supply levels of the dams will be destroyed by inundation, while associated infrastructure could damage or destroy those outside the full supply levels (**Table 11**).

Table 11: Impacts on places, buildings and structures

Places, buildings and structures	Extent	Duration	Intensity	Potential for irreplaceable loss of resources	Probability	Confidence	Significance
Lalini Dam size 1 (preferred alternative)							
Without Mitigation	n/a	n/a	n/a	n/a	n/a	n/a	n/a
With Mitigation	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Lalini Dam size 2							
Without Mitigation	n/a	n/a	n/a	n/a	n/a	n/a	n/a
With Mitigation	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Lalini Dam size 3							
Without Mitigation	n/a	n/a	n/a	n/a	n/a	n/a	n/a
With Mitigation	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Ntabelanga Dam							
Without Mitigation	Site	Long term	Negligible	Low	Improbable	Medium-High	Low
With Mitigation	Site	Long term	Negligible	Low	Improbable	Medium-High	Low
Cumulative Impact Not applicable							

Recommended mitigation:

- Thorough identification of abandoned homesteads and recording of field ownership, preferably in the presence of headmen and community elders, is required.
- Structures such as number 3 in Table 10, the extant livestock byre, will require replacement so that the relevant family's socio-economic activities can continue.
- No further recording of abandoned homestead structures is required before destruction; they have been recorded sufficiently during this Phase 1 HIA.
- A destruction permit is required from ECPHRA; if possible a single permit should be obtained for all structures.

7.1.2 Graves and burial grounds

A **grave** is a place of interment located outside of a formal cemetery administered by a local authority. It includes the contents, headstone or other marker of such a place, and any other structure on or associated with such a place. The national estate includes the following:

- Ancestral graves;
- Royal graves and graves of traditional leaders;
- Graves of victims of conflict;
- Graves of individuals designated by the Minister by notice in the *Gazette*;
- Historical graves and cemeteries; and
- Other human remains which are not covered in terms of the Human Tissue Act 65 of 1983.

Table 12 lists the locations of potential and confirmed ancestral graves potentially affected by the proposed Ntabelanga Dam. None were identified within the proposed Lalini Dam basin. All human remains have high heritage significance, with a field rating of 3B and Grade High Significance.

Table 12: Locations of ancestral graves within proposed Ntabelanga Dam basin

Ntabelanga Dam Basin			
Description	**Location relative to FSL**	**S**	**E**
1 Abandoned homestead with possible graves	937 m asl. Within FSL	31 05.204	28 33.363
2 Abandoned homestead with possible graves	939 m asl. Within FSL	31 05.174	28 33.523
3 Abandoned homestead with possible graves	938 m asl. Within FSL	31 05.379	28 33.732
4 Existing homesteads with graves	At Thambekeni	31 05.596	28 40.025
5 Existing homestead with graves	At Thambekeni	31 05.449	28 40.123

6	Existing homestead with graves	At Sinqungweni	31 06.985	28 39.468
7	Existing homestead with graves	At Luxeni	31 05.640	28 34.635
8	Existing homestead with graves	At Caba	31 05.080	28 37.181

All graves within the full supply levels of the dams will be destroyed by inundation, while associated infrastructure could damage or destroy those outside the full supply levels (**Table 13)**.

Table 13: Impacts on ancestral graves

Ancestral graves	Extent	Duration	Intensity	Potential for irreplaceable loss of resources	Probability	Confidence	Significance
Lalini Dam size 1 (preferred alternative)							
Without Mitigation	n/a	n/a	n/a	n/a	n/a	n/a	n/a
With Mitigation	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Lalini Dam size 2							
Without Mitigation	n/a	n/a	n/a	n/a	n/a	n/a	n/a
With Mitigation	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Lalini Dam size 3							
Without Mitigation	n/a	n/a	n/a	n/a	n/a	n/a	n/a
With Mitigation	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Ntabelanga Dam							
Without Mitigation	Local	Permanent – no mitigation	Very high	High	Definite	High	High
With Mitigation	Site	Permanent – mitigated	Low	Medium	Low	Medium-High	Low
Cumulative Impact Not applicable							

Recommended mitigation:

- The locations of ancestral graves at abandoned homesteads must be ascertained. The exact location and date of the burial, name and age of the deceased, and name(s) and contact details of next-of-kin must be recorded, and the burial place should be described and photographed.
- All graves within the full supply levels of the dam should be relocated, with the permission of the next-of-kin and a permit from ECPHRA.

- No new associated infrastructure may be located within 100 m of graves outside the full supply levels; if this distance cannot be maintained such graves may have to be relocated.
- All graves outside the full supply levels within 300 m of associated infrastructure should be demarcated by the Environmental Control Officer, in consultation with the next-of-kin, for the duration of construction with metal stanchions, fencing wire and red and white barrier tape.

7.1.3 Archaeological sites

Archaeological means:

- Material remains resulting from human activity which are in a state of disuse and are in or on land and are older than 100 years, including artefacts, human and hominid remains and artificial features and structures;
- Rock art, being any form of painting, engraving or other graphic representation on a fixed rock surface or loose rock or stone, which was executed by human agency and is older than 100 years including any area within 10 m of such representation;
- Wrecks, being any vessel or aircraft, or any part thereof, which was wrecked in South Africa, whether on land, in the internal waters, the territorial waters or in the culture zone of the Republic, as defined respectively in sections 3, 4 and 6 of the Maritime Zones Act 15 of 1994, and any cargo, debris or artefacts found or associated therewith, which is older than 60 years or which SAHRA considers to be worthy of conservation;
- Features, structures and artefacts associated with military history which are older than 75 years and the sites on which they are found.

All locations in the study areas in which archaeological sites might reasonably be expected have been subject to ploughing, thus compromising the integrity of such sites. Furthermore, potential locations of Iron Age archaeological sites remain preferred crop production fields today, and the presence of standing crops hindered the identification of such sites.

One archaeological site in each of the proposed Ntabelanga and Lalini Dam basins was identified (**Table 14**). Site 1 has medium significance, with a field rating of 4B and Grade Generally Protected B. Site 2 has medium to high significance, with a field rating of 4A and Grade Generally Protected A.

Table 14: Archaeological sites identified in proposed dam basins

Ntabelanga Dam Basin			
Archaeological sites	**Location relative to FSL**	**S**	**E**
1 LSA knapping floor	948 m asl. Within FSL	31 06.550	28 30.746
Laleni Dam Basin			
2 EIA smelting site c. 900AD	732 m asl. Within FSL	31 15.030	28 55.555

All archaeological sites within the full supply levels of the dams will be destroyed by inundation, while associated infrastructure could damage or destroy those outside the full supply levels (**Table 15**).

Table 15: Impacts on archaeological sites

Archaeological sites	Extent	Duration	Intensity	Potential for irreplaceable loss of resources	Probability	Confidence	Significance
Lalini Dam size 1 (preferred alternative)							
Without Mitigation	Site	Permanent – no mitigation	Very high	High	Medium-High	High	High
With Mitigation	Site	Permanent – mitigated	Low	Medium	Low	Medium-High	Low
Lalini Dam size 2							
Without Mitigation	Site	Permanent – no mitigation	Very high	High	Medium-High	High	High
With Mitigation	Site	Permanent – mitigated	Low	Medium	Low	Medium-High	Low
Lalini Dam size 3							
Without Mitigation	Site	Permanent – no mitigation	Very high	High	Medium-High	High	High
With Mitigation	Site	Permanent – mitigated	Low	Medium	Low	Medium-High	Low
Ntabelanga Dam							
Without Mitigation	Site	Permanent – no mitigation	Very high	High	Medium-High	High	High
With Mitigation	Site	Permanent – mitigated	Low	Medium	Low	Medium-High	Low
Cumulative Impact Not applicable							

Recommended mitigation:

- Site 1 should be mapped in detail, with judicious sampling, authorised by a permit from ECPHRA. Thereafter the site may be destroyed once a destruction permit has been issued by ECPHRA.
- Site 2 should be mapped and excavated/sampled, authorised by a permit from ECPHRA. Thereafter the site may be destroyed once a destruction permit has been issued by ECPHRA.
- A detailed survey of potential Early Iron Age sites should be undertaken once crops have been harvested and vegetation clearance has occurred.

7.2 OPERATION PHASE

This section is not applicable, since impacts on heritage resources will be confined entirely to the construction phase.

8. IMPACT ASSESSMENT FOR ELECTRICITY GENERATION AND DISTRIBUTION INFRASTRUCTURE

This Chapter presents the findings of the environmental impact assessment for the electricity generation and distribution related activities (DEA Ref no. 14/12/16/3/3/2/678).

The activities assessed under this chapter are listed below:

- Tunnel and pipeline at the proposed Lalini Dam;
- Generation of hydro-power and feeding of this power into the existing grid; and
- An 18.5 km power line from the Lalini Dam tunnel.

8.1 CONSTRUCTION AND DECOMMISSIONING PHASES

Recommended mitigation:

- Fieldwork to identify heritage resources and recommended mitigation measures should be undertaken once final infrastructural locations and routes have been surveyed and pegged.

8.2 OPERATION PHASE

This section is not applicable, since impacts on heritage resources will be confined entirely to the construction phase.

9. IMPACT ASSESSMENT FOR ROADS INFRASTRUCTURE

This Chapter presents the findings of the environmental impact assessment for the road infrastructure (DEA Ref no. 14/12/16/3/3/1/1169).

The activities included under this chapter are listed below:

- Upgrading and relocation of roads and bridges.

9.1 CONSTRUCTION AND DECOMMISSIONING PHASES

Recommended mitigation:

Fieldwork to identify heritage resources and recommended mitigation measures should be undertaken once final infrastructural locations and routes have been surveyed and pegged.

9.2 OPERATION PHASE

This section is not applicable, since impacts on heritage resources will be confined entirely to the construction phase.

10. IMPACT ASSESSMENT FOR THE NO PROJECT ALTERNATIVE

If the project does not proceed, no negative impacts will accrue to heritage resources. In particular, residents will not be subject to the high emotional cost associated with ancestral grave relocation. Conversely, the scientific knowledge inherent in resources such as archaeological sites will remain unrecovered until and unless funding for research is obtained from another source.

11. CONSULTATION PROCESS

11.1 CONSULATION PROCESS FOLLOWED

Engagement with Interested and Affected Parties (I&APs) forms an integral component of the EIA process. I&APs have an opportunity at various stages throughout the EIA process to gain more knowledge about the proposed project, to provide input into the process and to verify that their issues and concerns have been addressed.

The proposed project was announced in April 2014 to elicit comment from and register I&APs from as broad a spectrum of public as possible. The announcement was done by the following means:

- The distribution of Background Information Documents (BIDs) in English and isiXhosa;
- Placement of site notices in the project area and Municipal offices (Tsolo and Qumbu);
- Placement of advertisements in one regional (The Herald) and two local (Daily Dispatch and the Mthatha Fever) newspapers; and
- Publication of all available information on the DWS web site (www.dwa.gov.za/mzimvubu).

The Draft Scoping Report (DSR) was made available for a 30 day public comment period in May 2014. All documents were uploaded to the web, notification letters were sent out, the summary of the DSR was translated into isiXhosa, distributed to all registered stakeholders and hardcopies of the full report and translated summary report were available at public places. Additionally, three public meetings were held in the affected areas, Siqhungqwini, Tsolo and Lalini respectively. An Authorities Forum Meeting with all relevant authorities was held in East London on 28 May 2014. This was to assist the authorities with commenting on the relevant documentation.

Comments received from stakeholders were captured in the Issues and Response Report (IRR) which formed part of the Final Scoping Report (FSR). The FSR was made available to the public for a 21 day comment period on 13 June 2014 and was submitted to the Department of Environmental Affairs (DEA). Comments received during the Final Scoping public comment period were compiled and an updated IRR was submitted to DEA on 8 July 204 and uploaded to the website. The FSR was accepted by DEA with certain conditions on 15 July 2014. Following this, a newsletter was compiled and translated to isiXhosa, explaining everything that has happened to date as well as what is to come. Both the English and isiXhosa versions were electronically distributed to all registered stakeholders and hardcopies were distributed by the local facilitators in the affected areas.

The Draft Environmental Impact Assessment Report (DEIR), its summary (translated into isiXhosa), the various specialist studies, the Environmental Management

Programmes (one for the construction and operation of the project, and one for the borrow areas and quarries) as well as the Water Use Licence Application will be made available for a period of thirty (30 days) for stakeholders to comment. Hardcopies will be made available at the same venues as the DSR and all documents will be uploaded to the website. The availability of these documents as well as the announcement of the upcoming public meetings in Siqhungqwini, Tsolo and Lalini will be advertised on the Eastern Cape SABC radio station, Umhlobo Wenene FM, which has a listenership of over 4 million people. Another Authorities Forum Meeting is scheduled for October 2014.

Stakeholder comments will be taken into consideration with the preparation of the final documents. The availability of the final documents will be announced prior to submission to the decision-making authority. Once a decision has been made by the DEA, all stakeholders will again be notified.

The following issues were sourced from the Issue and Response Report (Final Version 1) as submitted to the Department of Environmental Affairs with the Final Scoping Report.

11.2 SUMMARY OF COMMENTS RECEIVED

Issue/Comment/Question	Date received	Origin	Response
Stakeholder asked how the homes that have graves will be moved. Culturally, a cow needs to be slaughtered to apologise to the ancestors if a grave is to be removed.	14.06.2014 via email	Siphesihle Magazi (Resident)	The Environmental Impact Assessment is intended to inform the authorities that must approve the development of the Project which is now at a proposal stage. The Impact Assessment will inform the authorities on, for instance, how many graves will be affected and what processes will have to be followed to deal with that matter. There are various laws that must be complied with when the impact on graves and other cultural and heritage resources are managed during implementation of the project. This happens during the implementation phase, when dams and other structures are constructed, and not during this assessment or preparation phase. Various options are open to the families of deceased persons, whose graves are affected by such development, including relocation of the graves to another cemetery. The relocation process includes exhumation and reburial in close cooperation and after consultation with the affected families. The consultations include agreeing on the processes to be followed which usually include all the traditional customs and rituals which are for the cost of

			the project. These customs include paying homage to the ancestors which often involve the slaughtering of animals. The project also covers the cost of these animals. If the affected family itself has to be relocated because their house is affected by the project then the graves are usually reburied in a cemetery at or close to their new house. There is no intention of physically touching or removing any graves during the Environmental Impact Assessment which is now being undertaking. It is now only necessary to determine, as accurately as possible, how many graves are affected and to estimate the extent of the work that will be necessary to relocate these graves after detailed social consultations. It is also necessary to estimate the cost of these activities so that a budget can be prepared for purposes of securing the necessary funds for the project.
Heritage Assessment: I refer you to The Distribution of Early Iron Age Settlements in Eastern Cape … by J. Feely, *et al*.	01.07.2014 via email	Sizakele Gabula (Department of Environmental Affairs)	This article was consulted in the drafting of this report.

12. OTHER INFORMATION REQUESTED BY THE AUTHORITY

This Phase 1 HIA fulfils the requirements of Section 38(3) of the NHRA, subject to the limitations described in Section 5 of this report, in particular the following:

- At the time of fieldwork only the data for the preferred full supply levels of the dams was available. Consequently we were unable to assess the impacts of appurtenant infrastructure, and have recommended that such assessment take place once the necessary surveys are complete.
- Fieldwork was constrained by the presence of vegetation over a large part of the study area, especially where crops were standing in fields where Iron Age archaeological sites could be expected. In such areas staff members focused on exposed soil surfaces in tracks and paths.
- Soil surface visibility was non-existent to moderate. Heritage resources might be present below the surface or in areas of dense vegetation and we remind the client that the NHRA requires that a developer cease all work immediately and notify SAHRA should any heritage resources, as defined in the Act, be discovered during the course of development activities.
- No subsurface investigation (including excavations or sampling) were undertaken, since a permit from SAHRA is required to disturb a heritage resource.

13. IMPACT STATEMENT

The following table summarise the impacts on heritage resources and recommended mitigation measures.

Places, buildings and structures	Significance of impact	Mitigation measures
Lalini Dam size 1 (preferred alternative), size 2 and size 3		
Without Mitigation	n/a	Not applicable
With Mitigation	n/a	
Ntabelanga Dam		
Without Mitigation	Low	Identification of abandoned homesteads and recording of field ownership. Structures such as livestock byres will require replacement. No further recording of abandoned homestead structures is required. A destruction permit is required from ECPHRA.
With Mitigation	Low	
Cumulative Impact Not applicable		
Ancestral graves	**Significance of impact**	**Mitigation measures**
Lalini Dam size 1 (preferred alternative), size 2 and size 3		
Without Mitigation	n/a	Not applicable
With Mitigation	n/a	
Ntabelanga Dam		
Without Mitigation	High	The locations of graves at abandoned homesteads must be ascertained. All graves within the full supply levels of the dam should be relocated. No new associated infrastructure may be located within 100 m of graves outside the full supply levels; if this distance cannot be maintained such graves may have to be relocated. All graves outside the full supply levels within 300 m of associated infrastructure should be demarcated, for the duration of construction.
With Mitigation	Low	
Cumulative Impact Not applicable		
Archaeological sites	**Significance of impact**	**Mitigation measures**
Lalini Dam size 1 (preferred alternative) , size 2 and size 3		
Without Mitigation	High	Site 1 should be mapped in detail before destruction. A detailed survey of potential Early Iron Age sites should be undertaken.
With Mitigation	Low	
Ntabelanga Dam		
Without Mitigation	High	Site 2 should be mapped and excavated/sampled before destruction. A detailed survey of potential Early Iron Age sites should be undertaken.
With Mitigation	Low	
Cumulative Impact Not applicable		

14. CONCLUSION AND RECOMMENDATIONS

This Phase 1 HIA fulfils the requirements of Section 38(3) of the NHRA, subject to the limitations described in Section 5 of this report, in particular the fact that at the time of fieldwork only the data for the preferred full supply levels of the dams was available. Consequently we were unable to assess the impacts of appurtenant infrastructure. Fieldwork was further constrained by the presence of vegetation over a large part of the study area, especially where crops were standing in fields where Iron Age archaeological sites could be expected.

Accordingly, the recommendations of this HIA report are as follows:

Buildings and structures:

- Thorough identification of abandoned homesteads and recording of field ownership, preferably in the presence of headmen and community elders, is required.
- Structures such as number 3 in Table 10, the extant livestock byre, will require replacement so that the relevant family's socio-economic activities can continue.
- No further recording of abandoned homestead structures is required before destruction; they have been recorded sufficiently during this Phase 1 HIA.
- A destruction permit is required from ECPHRA; if possible a single permit should be obtained for all structures.

Graves and burial grounds:

- The locations of ancestral graves at abandoned homesteads must be ascertained. The exact location and date of the burial, name and age of the deceased, and name(s) and contact details of next-of-kin must be recorded, and the burial place should be described and photographed.
- All graves within the full supply levels of the dam should be relocated, with the permission of the next-of-kin and a permit from ECPHRA.
- No new associated infrastructure may be located within 100 m of graves outside the full supply levels; if this distance cannot be maintained such graves may have to be relocated.
- All graves outside the full supply levels within 300 m of associated infrastructure should be demarcated by the Environmental Control Officer, in consultation with the next-of-kin, for the duration of construction with metal stanchions, fencing wire and red and white barrier tape.

Archaeological sites:

- Site 1 should be mapped in detail, with judicious sampling, authorised by a permit from ECPHRA. Thereafter the site may be destroyed once a destruction permit has been issued by ECPHRA.

- Site 2 should be mapped and excavated/sampled, authorised by a permit from ECPHRA. Thereafter the site may be destroyed once a destruction permit has been issued by ECPHRA.
- A detailed survey of potential Early Iron Age sites should be undertaken once crops have been harvested and vegetation clearance has occurred.

General

- Fieldwork to identify heritage resources affected by roads and electrical infrastructure, and recommended mitigation measures, should be undertaken once final infrastructural locations and routes have been surveyed and pegged.

We recommend that this project proceed subject to the implementation of the recommended mitigation measures and have submitted this report to the Eastern Cape Provincial Heritage Resources Agency, ECPHRA, in fulfilment of the requirements of the National Heritage Resources Act.

If ECPHRA grants permission for the development to proceed, the client is reminded that the Act requires that a developer cease all work immediately and contact ECPHRA should any heritage resources, as defined in the Act, be discovered during the course of development activities.

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