



the dme

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REPUBLIC OF SOUTH AFRICA

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Reference:
Date:

EC 30/5/1/3/3/2/1/0384 EM
15 October 2009

South African Heritage Resources Agency
P.O. Box 759
EAST LONDON
5200

Case no: 2396

ATTENTION: MR. T. LUNGILE

Sir

**CONSULTATION IN TERMS OF SECTION 40 OF THE MPRDA OF 2002:
ENVIRONMENTAL MANAGEMENT PLAN (EMP); EXPANSION OF TSOJANA
QUARRY, DIVISION OF COFIMVABA**

1. Attached herewith, please find a copy of a EMP received from Department: Water Affairs, for your comments.
2. Please forward any written comments or requirements your department may have in this regard, to this office not later than **12 December 2009**. Failure to do so, will lead to the assumption that your department has no objection(s) or comments with regard to the said document.
3. Consultation in this regard has also been initiated with other relevant State Departments.
4. Please use the reference number (EC) 30/5/1/3/3/2/1(0384) EM in all future correspondence.
5. Your co-operation is appreciated.

Sincerely,



**REGIONAL MANAGER
EASTERN CAPE**



water affairs

Department:
Water Affairs
REPUBLIC OF SOUTH AFRICA

Private Bag X313, Pretoria, 0001, Sedibeng Building 185 Schoeman Street, Pretoria
Tel: (012) 336-6651 Fax: (012) 336-8984, www.dwaf.gov.za

Tel: 012 336 8301 Fax: 012 336 8786 e-mail:

Enquiries: I. Segers Ref: 20/2/S500-05/D/1/4

Knight Piésold (Pty) Ltd

PO Box 221

Rivonia

2128

Attention: Mr C.J. Abrahamson (Project Leader)

Dear Sir,

PROJECT NUMBER WP9024: FULL DESIGN SERVICES AND CONSTRUCTION SUPERVISION FOR THE REHABILITATION OF DAMS TO COMPLY WITH DAM SAFETY STANDARDS

TSOJANA DAM: FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE EXPANSION OF TSOJANA QUARRY: TWO SIGNED COPIES

Find included herewith two copies (1 colour and 1 black & white) of the "Final Environmental Management Programme for the Expansion of Tsojana Quarry" for the abovementioned project duly signed as requested in your letter 5163/30/004/CJA dated 14 July 2009.

Also attached please find the Financial Guarantee, duly signed, to the Regional Manager of the Department of Minerals and Energy, confirming that funds have been provided for the rehabilitation of the quarry after the completion of construction.

Yours faithfully


M DIRECTOR-GENERAL
Date: 2009/8/31



Department of Water Affairs • Departement van Waterwese • Muhasho wa zwa Madi • uMnyango wezaManzi • Ndzawulo ya ta Mati
Lefapha la Ditaba tsa Metsi • Kgoro ya Merero ya Meetse • Lefapha la Merero ya Metsi • LITIKO leTemanti
ISebe lezaManzi • UmNyango weeNdaba zaManzi

D/2009/10/13/001
EC 3015/1/3/2/0384MP





water affairs

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Enquiries: I. Segers Ref: 20/2/S500-05/D/1/4

Director-General
Department Minerals and Energy
Private Bag X59
Pretoria
0001

For Attention: Mr Mawonga Mandleni
Regional Manager: Eastern Cape Province

Dear Sir,

DAM SAFETY REHABILITATION PROGRAMME FOR GOVERNMENT WATER WORKS: CONFIRMATION OF FINANCIAL GUARANTEE: QUARRY FOR TSOJANA DAM

The Environmental Management Programme for the abovementioned project submitted to your office for approval in terms of section 106 (2) of the Mineral and Petroleum Resources Development Act, Act No. 28 of 2002, refers.

This is to confirm that funds are allocated on the approved budget for the rehabilitation of the quarry as described in the EMProg report, "Final Environmental Management Programme for the Expansion of Tsojana Quarry", dated July 2009 (Report No: 5163/7/30/F), in accordance with the inter departmental agreement (see a copy of the MoU attached).

I thank you for your co-operation in anticipation of approval.

Yours faithfully


DIRECTOR-GENERAL
Date: 2009/8/31



MEMORANDUM OF UNDERSTANDING

BETWEEN

THE DEPARTMENT OF WATER AFFAIRS AND FORESTRY

**DULY REPRESENTED BY
MR JI SINDANE**

**IN HIS CAPACITY AS
DIRECTOR-GENERAL: WATER AFFAIRS AND FORESTRY**

AND

THE DEPARTMENT OF MINERALS AND ENERGY

**DULY REPRESENTED BY
ADV S NOGXINA**

**IN HIS CAPACITY AS
DIRECTOR-GENERAL: MINERALS AND ENERGY**

ON

**FINANCIAL PROVISION ASSOCIATED WITH THE REHABILITATION OF QUARRIES
AND BORROWED AREAS USED FOR THE CONSTRUCTION OR MAINTENANCE OF
DAMS OR ANY OTHER WATER RESOURCE INFRASTRUCTURE**

Jointly hereinafter referred to as the parties

PREAMBLE

WHEREAS in terms of the National Water Act, 1998 (Act No. 36 of 1998), the Minister of Water Affairs and Forestry may enquire, construct, alter, repair, operate or control Government water works in order to protect, use, develop, conserve, manage and control the nation's water resources in the public interest;

WHEREAS section 41(1) of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002) requires an applicant for a prospecting right, mining right or mining permit, to make the prescribed financial provision for the rehabilitation and management of negative environmental impacts, before the Minister approves the environmental management plan or environmental management programme;

WHEREAS the Department of Water Affairs And Forestry (*hereinafter referred to as DWAF*) raised some concerns on the implementation on section 41(1) of the Mineral and Petroleum Resources Development Act, 2002 with respect to the methods of financial provision for the rehabilitation and management of negative environmental impacts prescribed in the Mineral and Petroleum Resources Regulation 53 as it relates to quarrying and burrowed activities undertaken during the development and maintenance of water resource infrastructure and recognising the requirements of the Public Finance Management Act, 1999 (Act No 1 of 1999) in particular for the efficient use of State funds;

AND PURSUANT to a meeting on, Friday 6 October 2006 between representatives of DWAF and the Department of Mineral and Energy (*hereinafter referred to as DME*) where a common understanding was reached on the implementation of sections 41(1) and 106 of the Mineral and Petroleum Resources Development Act, 2002 read with the Government Notice No. R.762 of 25 June 2004 as published in Government Gazette No. 26501;

NOW THEREFORE THE PARTIES' UNDERSTANDING IS HEREWITH RECORDED AS FOLLOWS:


The purpose of this Memorandum of Understanding is to confirm consistent compliance of legislation by DWAF when undertaking construction or maintenance of Government water works infrastructure.

It is thus understood by both DWAF and DME that:

- 1.1 In terms of section 106(1) of the Mineral and Petroleum Resources Development Act, 2002 read with the Government Notice No. R.762 of 25 June 2004 published in Government Gazette No. 26501, an organ of state is only exempted from application procedures and the approval or granting of such right or permit in terms of sections 16, 20, 22 and 27 of the said Act,

- 1.2 Notwithstanding the exemption stated in clause 1.1 above, in terms of section 106(2) of the Mineral and Petroleum Resources Development Act, 2002, the provisions pertaining to environmental management, financial provision and mine closure in terms of the Mineral and Petroleum Resources Development Act, 2002 and its supporting Regulations, applies to quarrying and burrowing activities undertaken by DWAF during the development or maintenance of water resource infrastructure.
- 2.1 With regard to section 41 of the Mineral and Petroleum Resources Development Act, 2002 and its supporting Regulations 53 and 54, DWAF, its agents, or developer or any other person contracted by DWAF, is not exempted from these provisions that requires financial provision to be made.
- 2.2 It is therefore agreed between the parties that for the construction and maintenance of Government water works undertaken by the DWAF's own Construction Unit, DWAF shall be deemed to comply with the requirements of financial provision: Provided that the estimated costs for the management, rehabilitation and closure of such quarries and borrowed areas or works are provided for within the approved budget for such Government water works.
3. This Memorandum of Understanding shall be in force upon signature by both parties, and shall remain in force until terminated by written notice signed by both parties.

Dated and signed in Pretoria on this 02 day of APRIL 2007


JI SINDANE

DIRECTOR-GENERAL: WATER AFFAIRS AND FORESTRY

Dated and signed in Pretoria on this 20TH day of MARCH 2007


ADV S NOGXINA

DIRECTOR-GENERAL: MINERALS AND ENERGY



water & forestry

Department:
Water Affairs and Forestry
REPUBLIC OF SOUTH AFRICA

RECEIVED 15 JUL 2009

DEPARTMENT OF WATER AFFAIRS AND FORESTRY

DAM SAFETY REHABILITATION PROGRAMME

FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME
FOR THE EXPANSION OF TSOJANA QUARRY

Submitted for Approval to the Department of Minerals and Energy
Section 106 and regulation 51 of the Mineral and Petroleum Resources Development
Act, 2002 (Act 28 of 2002)



JULY 2009

Report No: 5163/7/30/F

Prepared
by:

T Manzoni

Tamryn Manzoni
Environmental Scientist

Lead
Reviewer:

Amelia Briel

Amelia Briel
Acting Environmental
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CONSULTING

TSO 27/2

DEPARTMENT OF WATER AFFAIRS AND FORESTRY

DAM SAFETY REHABILITATION PROGRAMME

FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE EXPANSION
OF TSOJANA QUARRY

JULY 2009

EXECUTIVE SUMMARY

Knight Piésold (Pty) Ltd. was appointed by the Department of Water Affairs and Forestry (DWAF) to complete the refurbishment design of Tsojana Dam which is located in the Eastern Cape, on the Ncuncuzo River and lies approximately 13 km NNE of Cofimvaba. In order to undertake the rehabilitation work on the dam, an existing unlicensed quarry was identified, 400 m downstream of the dam and was investigated as a source for obtaining rock material to be used for upgrading of the spillway and dam embankment.

This Environmental Management Programme (EMProgramme) report has taken into account all South African legislation pertaining to the development of a quarry. The report was compiled following the Mineral and Petroleum Resources Development Act (MPRDA), 2002 regulation 51, the Standardised EMP for Prospecting Right and Mining Permit as well as the Standardised EMP for the DWAF Projects prepared by the Council for Scientific and Industrial Research (CSIR) in May 2002.

Desktop studies were undertaken to determine the environmental baseline conditions, however, there was a need to undertake two specialist studies, namely a Fauna and Flora study and a Cultural/Historical Assessment as it is anticipated that this project could potentially have high negative impacts on these two environmental receptors.

During the pre-operational phase, there are no activities that will lead to significantly high impacts on the receiving environment however, during the operational phase, three activities will lead to significantly high impacts on the receiving environment: the geology of the site will be disturbed by surface mining excavations, the excavation of the materials and the need for soils will impact on the topsoils and subsoils in the quarry area and high visual impacts due to the excavation of material during mining operations thereby increasing the quarry area.

During the closure phase, three significantly high impacts were identified: the disturbed geology, rehabilitation of the land as far as practicably and economically possible to the pre-mining land use (a positive impact), and the replacement and grading of soils on the

site will result in the enhancement of the ecological succession process which will also be positive.

Mitigation measures have been determined to prevent, minimise and mitigate all the significant impacts discussed in the Impact Assessment chapter and recommended monitoring plans have been provided. A public participation meeting was held on 19 March 2008 during which all Interested and Affected Parties (I&APs) were provided with background information regarding the project, given the opportunity to raise any issues and concerns and to take an active role in the project.

Financial provision for rehabilitation has been determined using the DME Guideline Document for the Evaluation of Quantum of Closure-Related Financial Provision Provided by a Mine, 2005. The DWAF will have to provide a quantum of R186 825.50 for rehabilitation at the end of the quarry's life based on the initial approved budget plan.

DEPARTMENT OF WATER AFFAIRS AND FORESTRY

DAM SAFETY REHABILITATION PROGRAMME

FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE EXPANSION
OF TSOJANA QUARRY

JULY 2009

ABBREVIATIONS

CEO	Chief Executive Officer
CSIR	Council for Scientific and Industrial Research
DEAT	Department of Environmental Affairs and Tourism
DEAET	Department of Economic Affairs, Environment and Tourism
DSRP	Dam Safety Rehabilitation Plan
DWAF	Department of Water Affairs and Forestry
ECA	Environment Conservation Act
ELO	Environmental Liaison Officer
EMProgramme	Environmental Management Programme
FSL	Full Supply Level
GFRWUA	Great Fish River Water Users Association
GN	General Notice
GWW	Government Water Works
I&APs	Interested and Affected Parties
MoU	Memorandum of Understanding
MPRDA	Minerals and Petroleum Resources Development Act
NEMA	National Environmental Management Act
NWA	National Water Act
RMS	Resources Management Services
SABS	South African Bureau of Standards

DEFINITIONS

Environmental Impact – any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organisation's environmental aspects.

Environmental Management Programme (EMProgramme) – this programme is recognised as the tool that provides the assurance that the project proponent has made suitable provision for mitigation. This document provides a description of the methods and procedures for mitigating and monitoring impacts.

Fauna - All living biological creatures, usually capable of motion, including insects and predominantly of protein-based consistency

Flora – All living plants, grasses, shrubs, trees, etc usually incapable of easy natural motion and capable of photosynthesis

Government Water Works - may be made up of a dam, pipeline, pump station, canal, weir, water purification facility, electricity supply station / system, sewage works, hazardous waste lagoon, etc. or combinations thereof

Topsoil – The layer of soil covering the earth which:

- Provides a suitable environment for the germination of seed
- Allows the penetration of water
- Is a source of micro-organisms, plant nutrients and in some cases seed
- Is not of a depth of more than 0.5 m

DEPARTMENT OF WATER AFFAIRS AND FORESTRY

DAM SAFETY REHABILITATION PROGRAMME

FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE EXPANSION
OF TSOJANA QUARRY

JULY 2009

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DEPARTMENT OF WATER AFFAIRS AND FORESTRY

DAM SAFETY REHABILITATION PROGRAMME

FINAL ENVIRONMENTAL MANAGEMENT PROGRAMME FOR THE EXPANSION
OF TSOJANA QUARRY

JULY 2009

1. INTRODUCTION

1.1 Background

The Department of Water Affairs and Forestry (DWAF), as owner of Government Water Works (GWW), is responsible for approximately 350 dams across the country. About 160 of these have been found to be below the current acceptable safety standard for registered dams. The Dam Safety Rehabilitation Programme (DSRP) is a multiyear project aimed at accelerating the rehabilitation of those dams which need to be brought in line with current safety standards.

Tsojana Dam is located on the Ncuncuzo River and lies approximately 13 km NNE of Cofimvaba. The dam is owned by the local government and its purpose is the supply of water to Cofimvaba. It was designed by O'Connell and Manthé & Partners and constructed in 1978 for water supply to Cofimvaba. The dam crest carries the district road which crosses the side channel spillway chute on a concrete bridge.

Knight Piésold (Pty) Ltd. was appointed by the DWAF to complete the refurbishment design and will be responsible for the construction supervision of the dam refurbishment operations. As part of the rehabilitation work on the dam, rock material is required for the upgrade of the spillway and dam embankment. An existing unlicensed quarry was identified 400 m downstream of the dam as a source for obtaining this rock material for upgrading purposes. Refer to **Figure 1** for the location map of Tsojana Dam and **Figure 2** for the proposed quarry.

As material is required for the upgrading of the dam, the DWAF, as an organ of state, hereby seeks approval in terms of Section 39 of the Minerals and Petroleum Resources Development Act (MPRDA), 2002 (Act 28 of 2002) from the Department of Mineral and Energy (DME) for the expansion of an existing unlicensed quarry. This Environmental Management Programme (EMProgramme) serves as the application for approval. Refer to Chapter 3 for the relevant environmental legislation regarding this project.

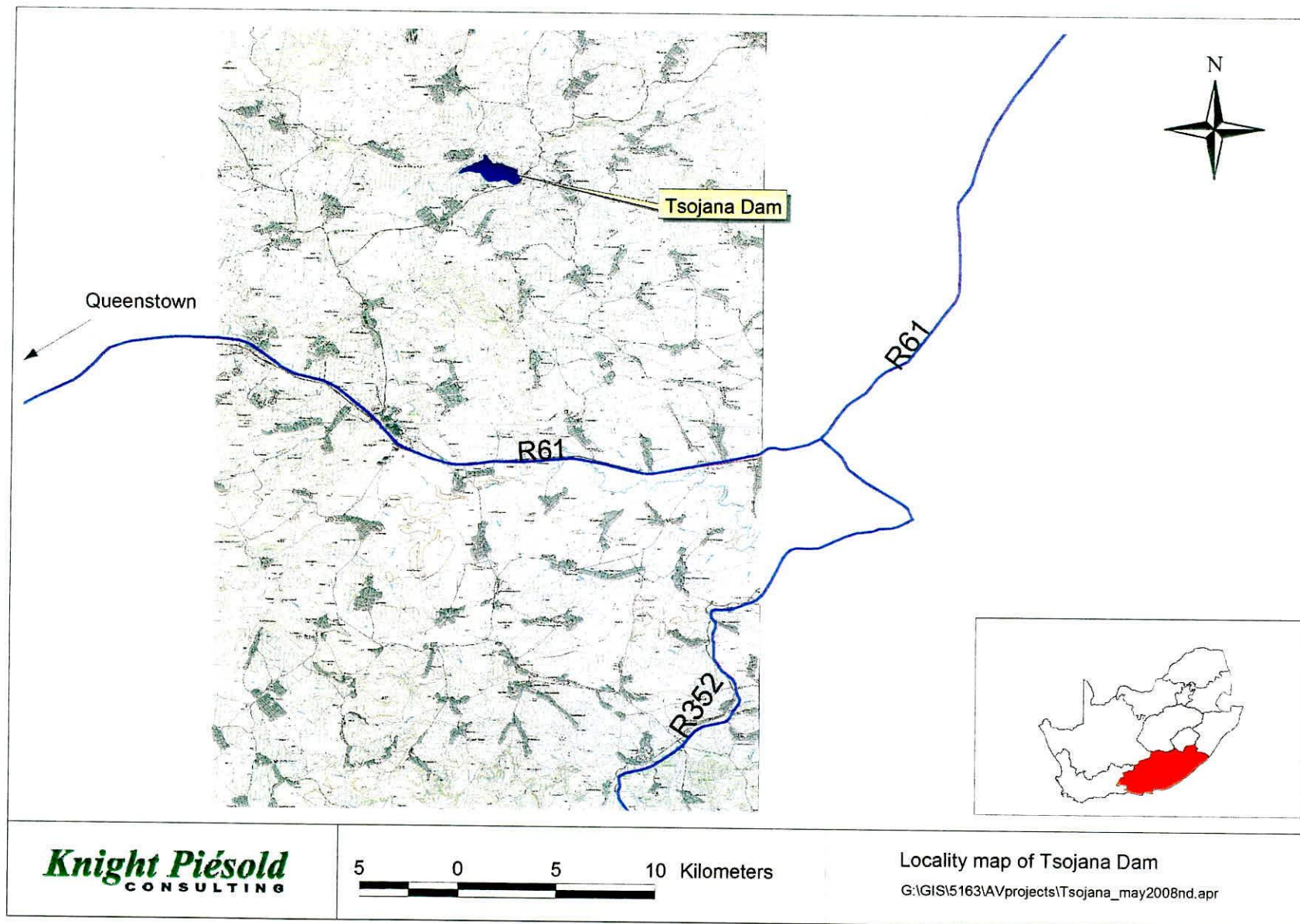


Figure 1: Map depicting the location of Tsojana Dam (Knight Piésold, 2008)

This EMProgramme report has taken into account all relevant South African legislation such as the National Water Act, 1998 (Act no 36 of 1998) (NWA), National Environmental Management Act, 1998 (Act no 107 of 1998) (NEMA), Environment Conservation Act (Act no 73 of 1989) (ECA), the Minerals and Petroleum Resources Development Act, 2002 (Act no 28 of 2002) (MPRDA) and all regulations associated with these acts.

1.2 Approach to the Environmental Management Programme

In terms of the MPRDA, 2002 (Act 28 of 2002), every person/entity applying for a mining right in terms of section 22 must conduct an Environmental Impact Assessment and submit an Environmental Management Programme. As DWAF is an organ of state, it is exempt from applying for a mining right (Section 106 (1)), and therefore only needs to submit an Environmental Management Programme (Section 106 (2)) to be submitted for approval to the DME, Eastern Cape.

Once the EMProgramme is authorised, the DWAF must comply with certain conditions to ensure compliance with the EMProgramme. Knight Piésold was appointed by DWAF to compile this EMProgramme with the objective to identify, assess and evaluate the impacts associated with the quarry activities on the receiving environment, determine the mitigation measures associated with the impacts identified and provide the necessary rehabilitation in order to return the area as far as practicably possible back to its natural state.

The following documents were used to compile this report:

- Tsojana Dam Design Report (Knight Piésold & Lukhozi Consulting, 2008)
- Environmental Screening Report Tsojana Dam (Knight Piésold Consulting, 2007)
- Flood Hydrology Report (Knight Piésold Consulting, 2007)
- Tsojana Dam Inception Report (Knight Piésold Consulting, 2007)
- Fauna and Flora Survey for the Tsojana Dam Quarry in the Eastern Cape (Resources Management Services, 2008)
- Heritage Impact Assessment Report for the Tsojana Dam Rehabilitation Project (Van Schalkwyk, J, 2008)
- Geotechnical Report for Tsojana Dam (Terreco, 2007)

1.3 Structure of the Environmental Management Programme

The structure of this document is as follows:

- Introduction
- Details of the land and owner
- Legislative requirements
- Description of the proposed project

- Description of the pre-mining environment
- Assessment of potential impacts
- Public participation
- Environmental management programme
- Emergency preparedness and response procedure
- Environmental monitoring
- Environmental management programme performance assessment
- Financial provision
- Conclusions
- References

This format is in line with the MPRDA Regulations.

1.4 Roles and Responsibilities

The Client, the DWAF Dam Safety Office, appointed Knight Piésold as the engineering consultant, responsible for the completion of the refurbishment design of Tsojana Dam as well as the construction supervision of the dam refurbishment and proposed quarry operations. DWAF will appoint a Contractor to undertake the quarry operation/excavation work and the Contractor shall appoint one of its senior staff as an Environmental Liaison Officer (ELO) who will be responsible for the implementation of the EMProgramme.

The Contractor will report to the Engineer appointed by DWAF and whose responsibility it is to supervise the Contractor's work. This Engineer will act as the Environmental Control Officer (ECO) for the project.

2. DETAILS OF THE LAND AND OWNER

Table 1: Land ownership details

Owner of Dam	Dam Safety Office: Department of Water Affairs and Forestry (DWAF)
Contact Person	Mr CL van den Berg
Address	Department of Water Affairs and Forestry (DWAF) Schoeman Street Pretoria, 0001
Tel:	(012) 336 7509
Cell:	082 806 5302
Fax:	(012) 336 8674

Email	fbf@dwaf.gov.za
Name and Address of the Owner of the Land	Department of Water Affairs and Forestry Contact Person: Same as above

2.1 Regional Setting

2.1.1 Location

Tsojana Dam is located on the Ncuncuzo River and lies approximately 13 km NNE of Cofimvaba in the Eastern Cape Province, and the existing Tsojana Quarry is located 400 m downstream of the dam. The Global Positioning System (GPS) coordinates for the dam are: S 31°53'00" E 27°38'00".

2.1.2 Magisterial District

Tsojana Dam and quarry falls within the Intsika Yethu Local Municipality and the Chris Hani District Municipality in the Eastern Cape.

2.1.3 Nearest Towns

Towns located nearest to the quarry are:

- Queenstown – 65 km west
- Cofimvaba – 13 km south south west
- Ngobo – 45 km north west
- Qamata – 20 km south east

2.1.4 Land Tenure

The existing quarry is situated on the DWAF's property.

3. RELEVANT ENVIRONMENTAL LEGISLATION

The National Water Act, 1998 (NWA)

The National Water Act, 1998 (Act no 36 of 1998) (NWA) directs, through section 109 for Water Works, that “The Minister may acquire, construct, alter, repair, operate or control government water works in order to protect, use, develop, conserve, manage and control the nation’s water resources in the public interest.” Further, when considering consultation and environmental impact assessment for such GWWs, Section 110 (1) provides requirements prior to the construction of a new water work. However, section 110 (2) (C) shows that subsection (1) does not apply “if the water work is a minor one”. It should be noted that the Dam Safety Rehabilitation Programme (DSRP) applies to existing Government Water Works and not new works, thus the activities to be undertaken are indeed minor works in relation to the existing infrastructure.

All the dams in the DSRP are existing dams with a safety risk. The control measures defined in the NWA section 118 (3) (C) state that the Minister may “direct the owner of a dam with a safety risk to undertake, at the owner’s cost, and within a period specified by the Minister, any specific repairs or alterations to that dam which are necessary to protect the public, property or the resource quality from a risk of failure of the dam”. It is this control measure that the DSRP undertakes to fulfil for the 160 dams identified as having an unacceptable safety risk. Although a regulation issued in terms of an Act cannot override another Act of Parliament, this department has taken cognizance of the intent of regulations, and other Acts.

The National Environmental Management Act, 1998 (NEMA)

At the inception of this project in 2005, DWAF approached the Department of Environmental Affairs and Tourism (DEAT) to obtain agreement on environmental procedures applied during the DSRP (Appendix A). In 2005, the now rescinded Regulations 1182, 1183 and 1184, published on 5 September 1997 in terms of the Environment Conservation Act, 1989 (Act no 73 of 1989) were applicable. It was agreed between the two departments and in consultation between DEAT and its nine provincial authorities, that the consequences of any dam failure would be significant environmental, social and economic degradation and that the DSRP should thus be seen in this light. It noted that the activities to be undertaken which include primarily increasing the discharge capacity spillways, making safe embankments and toe drains, or foundation improvement, and increasing of outlet capacity, were not listed activities and thus the programme did not require an authorisation from the environmental authorities.

Notwithstanding this compliance, this department, in pursuance of best practice, follows the principles of the National Environmental Management Act, 1998 (Act 107 of 1998) (NEMA). The department thus not only strives to minimise negative impacts on the environment, but these principles are also to be applied in designing their mitigation measures. Thus the department’s programme comprises undertaking a screening exercise for each dam, from

which an environmental management plan for the Contractor is compiled as per the spirit of NEMA.

The recent publication of Regulations 385, 386 and 387 issued in terms of Sections 24 and 24D of the National Environmental Management Act, 1998 (Act 107 of 1998) and published in April 2006, have not required a change in status of the cooperative agreement. The activities undertaken within the DSRP are still mitigation measures and are generally not listed activities. It should be noted that the full supply level of the dam is not being raised, nor is the extent of the government water works being increased, although the government water works boundaries are now being defined in some cases where this had not been done previously.

The Minerals and Petroleum Resources Development Act, 2002 (MPRDA)

Turning our attention to the activities undertaken to make the dam safe in accordance with present day safety standards, it is noted that in many cases material is required for embankment repairs or modification. Compliance with the Mineral and Petroleum Resources Development Act, 2002 (Act 28 of 2002), (MPRDA) is fulfilled by taking such material from the property of government water works wherever possible, and using it on the same water works for improving the safety of that works. (Section 106 (3) of the MPRDA states "any land owner or lawful occupier of land who lawfully takes sand, stone, rock, gravel or clay for farming or for effecting improvements in connection with such land or community development purposes, is exempt from the provisions of the subsection (1) as long as the sand, stone, rock, gravel or clay is not sold or disposed of").

In the event of fill or similar material having to be acquired from outside the bounds of the government water works for improvement of those works, then the contents of Regulation gazette no. 792 of 25 July 2004, which addresses the exemption of organs of State from certain provisions of the MPRDA, are noted. These state that the Minister of Minerals and Energy, acting in terms of Section 106 (1) of that act" hereby exempt the Department of Water Affairs and Forestry,... from the provisions of Section 16, 20, 22 and 27 of the said act in respect of any activity to remove any mineral for the construction and maintenance of dams, harbours, road and railway lines and for purposes incidental thereto." However, in such cases the department, although exempted from such provisions, must submit an Environmental Management Programme for approval in terms of Section 39 (4) of the Act, and in so doing should make it clear that the EMProgramme is submitted for approval and that DWAF is not an applicant. This is applicable to the Tsojana Quarry as the proposed quarry operations will take place outside of the Government Water Works and therefore approval is still required from DME.

4. DESCRIPTION OF THE PROPOSED PROJECT

4.1 Proposed Quarrying

The proposed stabilization of the embankment of Tsojana Dam requires approximately 13 000 m³ of hard rockfill and 1000 m³ of earthfill that must be obtained from a suitable source within or close proximity to the dam footprint. These materials will be placed on the downstream slope of the dam to improve the stability and on the upstream slope to provide slope protection in the form of riprap.

A two layer filter will be placed under the rockfill berm on the downstream slope. This filter will control any leaks through the dam and at the toe of the embankment. These filters will comprise a fine sand layer and a coarse gravel layer. A considerable amount of durable dolerite rock will therefore be required for both the rockfill and the filters.

Results

Both the quarry and borrow pit locations would best, for environmental reasons, be located below the dam's full supply level. Geological mapping and prospecting within the basin show, however, that there are no large dolerite deposits suitable for the opening of a hard rock quarry. Materials within the reservoir comprise mostly sedimentary rocks of the Karoo Beaufort Series, which comprise mainly of mudstones and fine grained sandstone, intruded by dolerite sills, whose weathering products can be expected to be fine grained clay soils. This material

4.2 Quarry Operations

The proposed quarry will cut into the existing hillside. The quarry operators will initially prepare the site by removing the vegetation and limited topsoil if any, thus exposing the rock material. The preparation of the site will also include the establishment of the crushing plant and excavation area associated with the quarry operations. Refer to **Figure 3** for the proposed Tsojana Quarry site.

The contractor will specify the blast pattern and explosives required to produce the requisite rock sizes. The blasting operators will drill holes into the exposed rock to predetermined depths and charge the holes with the requisite explosives. The explosives will then be detonated. All this will be carried out in accordance with the Occupational Health and Safety (OHS) Act, 1993 (Act no 181 of 1993) and the Explosives Act, 2003 (Act no 15 of 2003).

The excavated rock will thereafter require crushing and screening. The blasted rock will be transported from the blast area to the crushing plant with front-end loaders/excavators and/or dump trucks. The crushing plant will crush the rock down to the requisite sizes and thereafter, the screening plant will separate and wash the crushed rock into the correct aggregate sizes.

Once the requisite rock and aggregate sizes have been achieved, the material will be loaded into dump trucks and transported to the construction site where it will be placed on the embankment and used for the upgrading of Tsojana Dam.

4.3 Life of Quarry

The life of the quarry is expected to be 4 months, starting in January 2010.

4.4 Access Roads

The district road running along the crest of the embankment will be upgraded during the construction work on the spillway and embankment. The Roads Authority has been informed of the upgrade works but don't have capacity to upgrade the district road and therefore the upgrade of the road forms part of the Dam Safety Rehabilitation Programme. The district road will be upgraded to current roads standards with adequate layer works and asphalt surfacing.

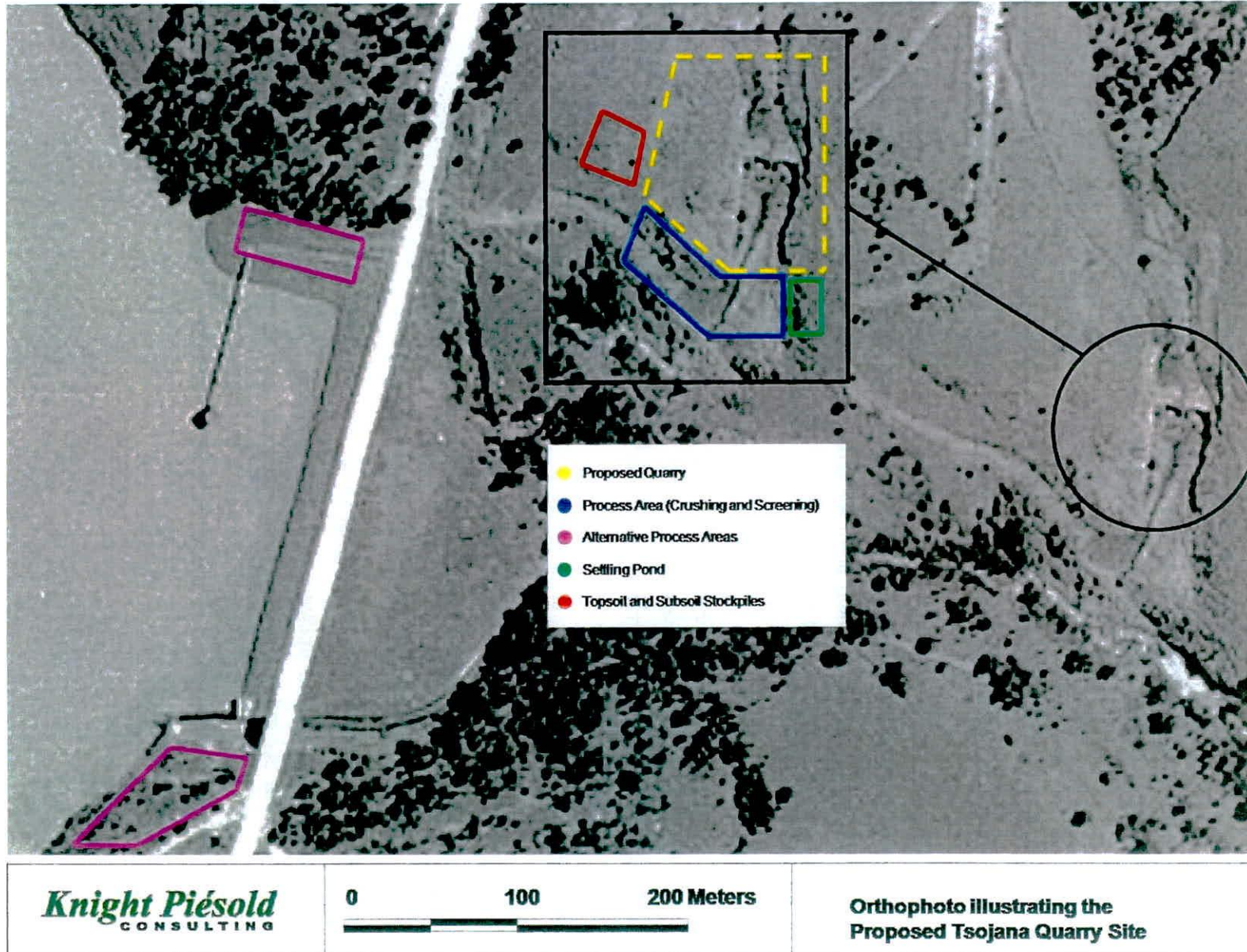


Figure 3: Proposed Tsojana Quarry Site (Knight Piésold, 2008)

The roadway should be surfaced by placing an additional 300 mm of base course with an asphalt surfacing (Clanahan & Associates, 2008). Armco safety barriers should be re-installed, with the alternative of solid walling on the upstream side. The roadway will have to be reduced to a single lane during the placing of base course material and the final asphalt seal. The road bridge parapets will have to be reconstructed, with road narrowing at the same time.

The road forms part of a public transport network. During construction, this route will be disrupted. The traffic along the road is relatively low and the construction works will not result in major delays. The road will be constructed in half widths allowing traffic to pass along in one direction at a time. The road reserve and length will not be altered during the upgrade of this road.

The old access roads to the quarry will be resurfaced with gravel to provide safe access to the dam.

As the upgrade of the access roads falls part of the DSRP, constitutes as maintenance work and not new construction, and does not fall part of Schedule 1 of the NEMA (Act 107 of 1998) EIA regulations (refer to Appendix A), approval is therefore not required from the Department of Environmental Affairs and Forestry (DEAT).

4.5 Other Surface Infrastructure

Currently, the only surface infrastructure on site is the dam itself. A workshop and wash bay area will be designated by the contractor to ensure that vehicles and equipment are kept in good working order. Potable water for domestic consumption will also be stored on site.

The necessary required potable water supply will be piped from existing supply infrastructure. If this is found to be insufficient or non-existent, water will be transported by tanker to site.

The construction site and quarry will be fenced off to prevent any unauthorised persons from entering the site. Notice boards will be placed on the fence informing any passersby that the area is deemed dangerous and unsafe. A crusher and screener may be established closer to the dam site as the quarry does not have sufficient space for the crushing and screening. There is an abandoned site yard on the left abutment of the dam which was used by the previous roads contractor. Crushing and screening could be established on this site.

4.6 Contractor's Camp

The Contractor's Camp will be located within the Tsojana Dam purchase area. Refer to **Figure 4** for the Construction Domain. The area adjacent to the reservoir on the right abutment will accommodate the contractor's camp. The quarry site is situated in close proximity to the dam site. The size of the camp is dependent on the Contractor's requirements but the required facilities will be specified in the Tender Document. These will include suitable ablution facilities, an adequate canteen and accommodation for the labour force.

4.7 Labour Force

The contractor will be compelled to maximise employment of labourers by means of following labour intensive practises as well as maximise local labour content. This is part of Government Policy to address poverty and unemployment.

A labour desk will be set up and a Community Liaison Officer appointed to ensure equitable opportunities and inter alia to ensure that the local labour practises are recognised and protected, provided that these are within the ambit of legal and lawful practises. Consultation with affected parties will take place closer to the construction time.

Within the Contractor's contract document, it will ensure that reasonable measures are put in place and maintained throughout the construction period.

4.8 Waste Management

Dustbins and skips will be provided at the quarry site and Contractor's Camp. The Contractor will be responsible for the management of domestic waste at these locations. Domestic waste will be collected on site, separated and thereafter disposed of at a licensed landfill site. This will be stipulated to the Contractor in the Tender Document.

4.9 Sanitation

The quarry site will be equipped with a single chemical toilet for the ten people operating the quarry. The toilet will be maintained by the Contractor for the duration of the contract. This maintenance will include cleaning and emptying of the toilet at regular intervals.

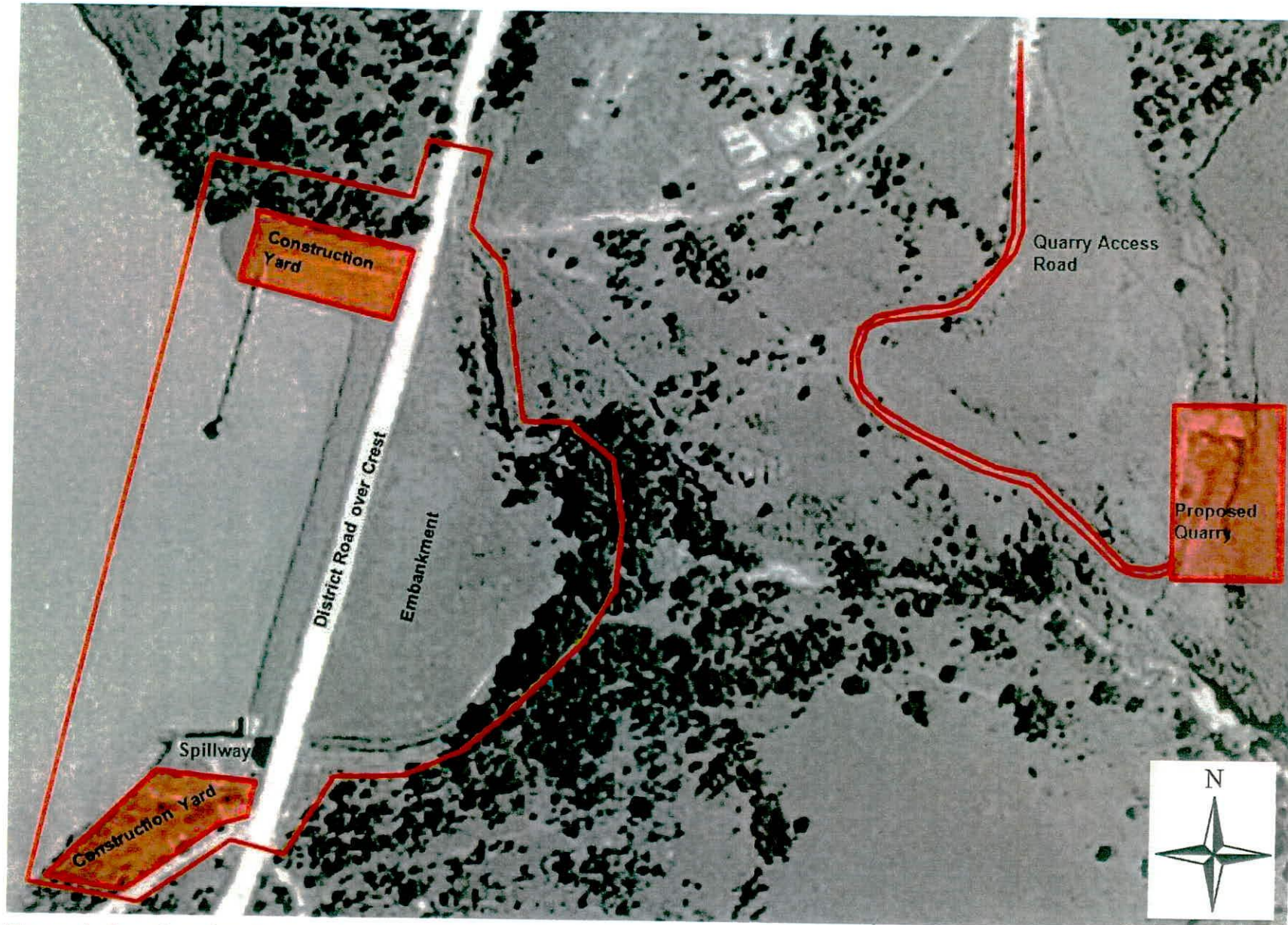


Figure 4: Construction Domain for Tsojana Dam and quarry site (Knight Piésold, 2007)

4.10 Surface Water

As the quarry will be situated along the hillface, it will be free draining and therefore, no water will settle at the bottom of the quarry upon closure. Any water that collects in the quarry during operation will be pumped out and discharged into a settling pond.

The raw water used for crushing, screening and dust suppression activities will be abstracted from Tsojana Dam. The screening and washing process of the blasted rock will require roughly 300 m³ (300 000 litres) of water per day. The dirty water from the washing and screening will be collected in a settling pond that will allow the dust and explosive residue to settle out of the water. The Contractor will ensure that he will comply with General Authorisation (Government Notice (GN) 399, 2004 (S. 21(g))) prior to the construction and storage of water in the settling ponds.

The settled water will then be re-used into the screening and dust suppression process or it can be returned to the Ncuncuzo River. However, if the latter is undertaken, the Contractor must ensure that the water quality meets the waste water limit values as specified in the General Authorisation (GN 399, 2004 (S. 21(f) and (h))).

4.11 Storage of Hazardous Material

All onsite fuel stores will be stored above ground in holding tanks with a capacity of less than 30 m³. This will be specified in the Tender Document. Environmental authorisation is not required from DEAT as it is not a listed activity in terms of the NEMA (Act 107 of 1998) regulations. A similar procedure will be followed for hazardous materials such as bitumen used in the surfacing of the roads.

4.12 Project Motivation

Tsojana Dam forms one of 160 dams that have been found to be below the current acceptable safety standard for registered dams. The DSRP is a multi-year project aimed at accelerating the rehabilitation of those dams to bring them in line with current safety standards.

The expansion of this quarry is imperative for the rehabilitation of the dam as it will provide material which will be used for the upgrade of the dam. The rehabilitation is necessary to protect the public, property and the resource from a risk of failure of the dam. The benefits of the project are to protect, use, develop, conserve, manage and control the nation's water resources in the public interest.

The consequences of any dam failure would be significant environmental, social and economic degradation and the DSRP should thus be seen in this light.

5. DESCRIPTION OF THE PRE-MINING ENVIRONMENT

5.1 Land Use

Land use is characterised by dispersed rural settlements and communal subsistence farming (maize, vegetables) and live stock farming (beef, diary, sheep) (DWAF, 2004). Natural pasture covers most of this area with communal and private stock farming the main activity.

5.2 General Geology

Tsojana Quarry is located 400 m downstream of the left flank dam embankment. The following section summarises the geological conditions for the quarry site:

The quarry is located on a dolerite outcrop as described in Section 4.1 with sedimentary rock of the Karoo Beaufort Series, which comprise mainly of fine grained sandstone and mudstone intruded by dolerite sills, who's weathering products can be expected to be fine grained clay soils.

5.3 Topography

The topography within the Eastern Cape consists of parallel hills, ridges and undulating plains (DEAT, 2000). The topography surrounding Tsojana Dam is generally lowlands with mountains (Appendix B).

5.4 Climate

The climate data for Tsojana Dam was obtained from the nearest weather station in the Eastern Cape namely Queenstown for the average rainfall, 24 hr average temperature, average maximum temperature and the average minimum temperature.

Queenstown weather station is located at 31.90°S 36.80°E, at a height of about 1094 m above sea level (www.worldclimate.com). Queenstown's data is derived from the Global Historical Climatology Network (GHCN) 1 for rainfall and GHCN 2 for the average temperature. GHCN is a comprehensive global surface baseline climate data set designed to be used to monitor and detect climate change and is comprised of surface station observations of temperature, precipitation and pressure. All GHCN data are presented on a monthly basis.

The temperature data below in Table 2 has been collected for approximately 470 months between 1940 and 1991 whereas the rainfall data has been collected for 788 months between 1900 and 1973.

Table 2: Climatological information for Tsojana Dam (GHCN 1 & 2)

Month	Temperature			Rainfall
	Average Minimum	Average Maximum	24 hr Average	
January	14.7	29.1	22.0	70.5
February	14.9	28.4	21.7	75.4
March	13.3	26.4	19.9	73.4
April	9.4	23.5	16.5	38.6
May	6.0	20.4	13.2	21.5
June	3.3	17.7	10.5	12.5
July	3.3	18.2	10.7	10.6
August	5.0	20.2	12.6	15.4
September	7.7	22.6	15.1	27.6
October	9.8	24.1	16.9	36.7
November	11.5	26.2	19.0	58.3
December	13.4	28.4	20.9	69.5
Year	9.3	23.7	16.5	509.7

The climate in this area reflects hot and dry summer months to very cold winter months (DWAF, 2004). According to GHCN 1, the average monthly maximum temperature within the summer months ranges between 24.1°C and 29.1°C, and during the winter months between 12°C and 17°C.

Rain falls predominantly in the summer months (70 % to 80 %) generally in the form of high intensity thunderstorms often accompanied by hail (DWAF, 2004) with average monthly precipitation ranging from 36.7 mm to 75.4 mm (GHCN 1, 2007). Variability of seasonal rainfall is high with frequent dry spells and droughts occurring. Mean annual evaporation rates of up to 1700 mm around the Cofimvaba area are experienced (DWAF, 2004).

5.5 Soils

Soils in the Tsono catchment are generally very shallow and rocky, mostly not suitable for crop production (DWAF, 2004). The soil located at the dam site and surrounding area reaches a depth of < 450 mm (DEAT, 2000). Refer to Appendix B for the General Soil Description map as well as the Soil Depth Classes. Alluvial soils are found in the river valleys.

5.6 Flora

A specialist from Resources Management Services (RMS) was responsible for conducting the flora study.

5.6.1 Methodology

Literature was reviewed to identify species that could possibly be found in the area. The habitats of these species were determined using a database of rare and threatened plants, which was accessed from the South African National Biodiversity Institute. The short time allocated for the survey did not allow for the seasonal abundances in certain species to be determined. In addition, several of the plants could only be identified to genus level as they had no flowering parts. Vegetation units/communities are classified floristically (RMS, 2008).

The site was visited on 23 March 2008. All plant species within the boundary of the site were either identified and noted, or collected for identification at a herbarium. Plant nomenclature follows Germishuizen and Meyer (2004).

5.6.2 Results

Conservation Status of the Area

The area is located within the Grassland biome, occurring in a hilly area with incised rivers and a considerable proportion of precipitation falling from mist. The vegetation type on the hills above the quarry is called Drakensberg Mosaic Foothill Grassland by Mucina and Rutherford (2006), however the site has species more adapted to riverine conditions and the species composition corresponds with Mucina and Rutherford's (2006) East Griqualand Grassland vegetation type. The indicator species for this type are the shrubs "ouhout" *Leucosidea sericea* and *Diospyros lycioides* both of which occur on the site. Only 0.2 % of this vegetation type is statutorily conserved in the Malegonyane Wildlife reserve and Mount Currie Nature Reserve (RMS, 2008). Over a quarter of this vegetation type has been transformed for maize cultivation, plantations and urban sprawl (Mucina and Rutherford 2006). The quarry has been worked on in the past, and occurs below a waterfall on a small tributary of the Tsojana River.

Status of the Veld and Plant Communities

The area immediately surrounding the quarry is relatively pristine grassland, apart from a few dongas and some stands of invading *Acacia mearnsii* (RMS, 2008). The dominant grasses form part of the *Setaria* genus and the area is termed the *Setaria - Cymbopogon* grassland. The *Setaria* spp. form dense mats along the slopes, which holds the soil well. A number of Sedge species occur in the quarry (Figure 5 and 6). *Fimbristylis dichotoma* dominates the areas around the water's edge (in well saturated soil). Other sedges such as

Mariscus congestus and *Scirpus* sp. also occur in this micro-habitat, as does the herb *Centella asiatica*.



Figure 5: View from the quarry, upstream from the waterfall (RMS, 2008)



Figure 6: View from the quarry, downstream from atop the waterfall (RMS, 2008)

Note: The green graminoid species in the foreground is *Fimbristylis dichotoma*. The shrubs (which are visible in the front right) are *Leucosidea sericea*. The trees (visible on the left and centre) are the invasive tree species, *Acacia mearnsii*.

The naturalized alien *Richardia brasiliensis* grows on higher ground and is able to colonise rockier terrain as do the grasses *Aristida diffusa subsp. burkei* and *Cynodon dactylon*. Trees such as *Leucosidea sericea* and *Buddleja saligna* and the shrubs such as *Diospyros lycioides*, *Searsia pyroides* and *Searsia dentate* are well established amongst the rocks. The ferns *Adiantum sp.* and *Blechnum australe* grow on the south facing wall of the waterfall where it is damp throughout most of the year (RMS, 2008).

Cymbopogon plurinodes, *Digitaria eriantha*, *Melinis nerviglumis* and *Eragrostis gummiflua* are found at the entrance to the quarry and in some higher lying areas. . According to the South African Biodiversity Institutes PRECIS Database the endangered *Centella sp.* is recorded for this quarter degree square (3227CA), however the species was not observed at the site.

Alien Plant Species

Acacia mearnsii is listed as a Category 1 invader in these grasslands (Conservation of Agricultural Resources Act 1983). Some alien invasive species do not pose a large threat: *Physalis peruviana*, which occurs in damp habitats, is not a serious invader; *Richardia brasiliensis* (a ground cover) is naturalised in the area and only occurs in localised habitats and *Schkuhria pinnata* is an herb that grows in disturbed localities. However, *A. mearnsii* does pose a threat to post closure rehabilitation (RMS, 2008).

Protected Plants

Eastern Cape provincial legislation protects all species of the *Adiantum* genus (Maiden Hair Fern). These plants are found growing on the river left of the waterfall on the rock face.

Table 3: Plant species list for the quarry site (arranged according to Family)

Adiantaceae Adiantum sp. Mohria caffrorum var caffrorum	Blechnaceae Blechnum australe	Oxalidaceae Oxalis semiloba
Anacardiaceae Searsia pyroides Searsia dentata	Buddlejaceae Buddleja saligna	Poaceae Aristida diffusa subsp. burkei Cymbopogon plurinodes Cynodon dactylon Digitaria eriantha Eragrostis gummiflua Harpochloa falx Hyparrhenia hirta Melinis nerviglumis Sporobolus africanus
Aneuraceae Richardia brasiliensis §	Cyperaceae Mariscus congestus Fimbristylis dichotoma Scirpus sp.	Rosaceae Leucosidea sericea
Araceae Zantedeschia albomaculata subsp. albomaculata	Ebenaceae Diospyros lycioides	Solanaceae Physalis peruviana § Solanum nigrum
Apiaceae Centella asiatica	Eriospermaceae Eriospermum sp.	Thelypteridaceae Thelypteris sp.
Asteraceae Artemisia afra Helichrysum simillimum Schkuhria pinnata § Senecio pterophormis Senecio inaequidens Nidorella c.f. resedifolia subsp. resedifolia Senecio terroformis	Fabaceae Acacia mearnsii §	Verbenaceae Lippia javanica
Anacardiaceae Searsia pyroides Searsia dentata	Gentianaceae Sebaea sp.	Vitaceae Rhoicissus tomentosa
	Geraniaceae Pelargonium reniforme	
	Lobeliaceae Lobelia neglecta	

§ Denotes an alien plant

5.7 Fauna

A specialist from Resources Management Services (RMS) was responsible for conducting the fauna study.

5.7.1 Methodology

A desktop study was conducted to generate a list of mammals, birds, reptiles and amphibians that were observed on and immediately adjacent to the quarry site (RMS, 2008). All rare (Red Data List) species are highlighted and their habitats noted. All signs of animals were recorded (including tracks, dung and hair).

5.7.2 Results

Mammals

A Rock Dassie (*Procavia capensis*) was seen disappearing behind some boulders however, no further evidence of mammals on the site was encountered (RMS, 2008).

Table 4: List of possibly occurring wild mammal species with their conservation status (Friedmann et al. 2004)

Common Name	Scientific Name	Conservation Status
Antbear	<i>Orycteropus afer</i>	NT
Baboon, Chama	<i>Papio ursinus</i>	LC
Caracal	<i>Felis caracal</i>	LC
Cat, African Wild	<i>Felis lybica</i>	LC
Dassie, Rock	<i>Procavia capensis</i>	Common
Duiker, Common	<i>Sylvicapra grimmia</i>	LC
Genet, Large Spotted	<i>Genetta tigrina</i>	LC
Gerbil, Highveld	<i>Tatera brantsii</i>	Common
Hare, Scrub	<i>Lepus saxatilis</i>	Common
Jackal Black-Jacked	<i>Canis mesomelas</i>	Common
Molerat, Common	<i>Cryptomys hottentotus</i>	Common
Mongoose, Water	<i>Atilax paludinosus</i>	LC
Mongoose, White Tailed	<i>Ichneumia albicauda</i>	LC
Mouse, Grey Climbing	<i>Dendromus melanotis</i>	LC
Mouse, House §	<i>Mus musculus</i>	Common
Mouse, Pouched	<i>Saccostomus campestris</i>	LC
Mouse, Pygmy	<i>Mus minutoides</i>	LC
Mouse, Striped	<i>Rhabdomys pumilio</i>	NT
Mouse, White-tailed	<i>Mystromys albicaudatus</i>	NT
Otter, Spotted-Necked	<i>Lutra maculicollis</i>	NT

Common Name	Scientific Name	Conservation Status
Polecat, Striped	<i>Ictonyx striatus</i>	NT
Porcupine	<i>Hystrix africaeustralis</i>	LC
Rabbit, Smith's Red	<i>Pronolagus rupestris</i>	Common
Rat, House §	<i>Rattus rattus</i>	Common
Rat, Vlei	<i>Otomys irroratus</i>	VU
Rhebok, Grey	<i>Pelea capreolus</i>	LC
Springhare	<i>Pedetes capensis</i>	LC
Steenbok	<i>Raphicerus campestris</i>	LC
Suricate	<i>Suricata suricata</i>	Common
Weasel, striped	<i>Poecilogale albinucha</i>	VU

§ Denotes an alien plant

Where: IUCN Red Data List Categories in order of rarity:

CE - Critically Endangered

E - Endangered

VU - Vulnerable

NT - Near Threatened

LC - Least Concern

DD - Data Deficient

Avifauna

Several hours were spent observing and recording birds at the site with binoculars. Robins, Chats and Martins were observed perching on rocks in the quarry. The Oriole was seen in the canopy of the trees close to the river. Table 5 contains all the species seen on site (RMS, 2008). A list of birds from the Roberts Multimedia package that have been recorded in the quarter degree square (3127DC) are included in Appendix C.

Table 5: Avifauna recorded on site (RMS, 2008)

Common Name	Scientific Name	Conservation Status
Robin, Brown	<i>Erythropygia signata</i>	Common
Chat, Buff Streaked	<i>Oenanthe bifasciata</i>	Common
Martin, Rock	<i>Hirundo fuligula</i>	Common
Brubru	<i>Nilaus afer</i>	Common
Oriole, Black Headed	<i>Oriolus iavatus</i>	Common
Dove, Cape Turtle	<i>Streptopelia capicola</i>	Common

Reptiles

There is adequate habitat for reptiles at the site, however no reptiles were observed during the field survey (RMS, 2008). Table 6 provides information on reptile species that possibly could inhabit the area. (Both local migrants and residents are listed).

Table 6: Reptiles that are known to occur in the area

Common Name	Scientific Name	Conservation Status
Lizards, Agama's, Skinks		
Agama, Southern Rock	<i>Agama atra</i>	Common
Gecko, Spotted Thick-toed	<i>Pachydactylus maculatus</i>	Common
Lizard Delande's Sandveld	<i>Nucras lalandii</i>	Common
Lizard, Burchells Sand	<i>Pedioplanis burchelli</i>	Common
Lizard, Spotted Sand	<i>Pedioplanis lineocellata</i>	Common
Monitor, Rock	<i>Varanus albigularis</i>	Uncommon
Plate Lizard, Yellow-throated	<i>Gerrhosaurus flavigularis</i>	Common
Skink, Cape	<i>Trachylepis capensis</i>	Common
Skink, Red-sided	<i>Trachylepis homalocephala</i>	Common
Snakes		
Adder, puff	<i>Bitis arietans</i>	Common
Ceterpede Eater, Cape	<i>Aparallactus capensis</i>	Common
Egg Eater, Southern Brown	<i>Dasypeltis scabra</i>	Common
Egg-eater, Common	<i>Dasypeltis scabra</i>	Common
Grass Snake, Cross-marked	<i>Psammophis crucifer</i>	Uncommon
Grass Snake, Spotted	<i>Psammophylax rhombeatus</i>	Common
Green Natal	<i>Philothamnus natalensis</i>	Common
Harlequin, Spotted	<i>Homoroselaps lacteus</i>	Common
House Snake, Aurora	<i>Lamprophis aurora</i>	Common
House, Southern Brown	<i>Lamprophis capensis</i>	Common
Many-spotted	<i>Amplorhinus multimaculatus</i>	Common
Red-lipped	<i>Crotaphopeltis hotamboeia</i>	Common
Rhombic night adder	<i>Causus rhombeatus</i>	Common
Rinkhals	<i>Hemachatus haemachatus</i>	Common
Skaapsteker, Rhombic	<i>Psammophylax rhombeatus</i>	Common

Common Name	Scientific Name	Conservation Status
Slug Eater, Common	Duberria lutrix	Common
Snake, Mole	Pseudaspis cana	Common
Southern Brown House	Lamprophis capensis	Common
Striped Harlequin Snake	Homoroselaps dorsalis	NT
Water, Common Brown	Lycodonomorphus rufulus	Common
Wolf, Cape	Lycophidion capense	Common
Chelonians		
Tortoise, Leopard	Geochelone pardalis	Uncommon

Amphibians

No amphibians were observed during the site visit, however it was raining and weather inclement (RMS, 2008). The following table lists the species that may occur in the area according to *The Atlas and Red Data Book of the Frogs of South Africa, Lesotho and Swaziland* (Minter et al. 2004). Species that occur are more likely to be found closer to the Tsojana River.

Table 7: Amphibians that are known to occur in the area (RMS, 2008)

Common Name	Scientific Name	Conservation Status
Caco, Boettger's	Cacosternum nanum nanum	Common
Cassina, Babbling	Kassina senegalensis	Common
Frog, Rattling	Semnodactylus wealii	Common
Platana, Common	Xenopus laevis	Common
Toad, Karoo	Buffo gariepensis	Common
Toad, Southern Pygmy	Buffo, vertebralis	Common

5.8 Surface Water

The area consists of the middle reaches of the Great Kei River with one of its main tributaries, the Tsomo River, with its headquarters in the Amatola mountain range (DAAF, 2004). Tsojana Dam and quarry are located in the Tsomo River catchment which, on a larger scale, falls in the Kei River catchment (Appendix B – River Catchment (DEAT, 2000)).

Tsojana Dam is situated on the Tsojana River, a tributary of the Tsomo River whose valley has its source in the southern Drakensberg range (the Stormberg) at an altitude of approximately 2500 metres above sea level (masl) and then descends in a fairly steep valley to enter the Great Kei River at 850 masl (DWAF, 2000).

5.9 Aesthetics

The proposed activities are located in the area that is predominantly vacant. The dam and a few access roads are the only infrastructure currently on site.

5.10 Cultural/Historical Aspects

The heritage impact assessment was completed by J van Schalkwyk, a Heritage Consultant. Refer to the Heritage Impact Assessment report in Appendix D for a detailed description of the area investigated.

5.10.1 Methodology

A survey of the relevant literature was conducted with the aim of reviewing the previous research done and determining the potential of the area (Van Schalkwyk J, 2008). In this regard, various anthropological, archaeological and historical sources, as well as survey reports, were consulted.

The Heritage Sites Database and the Environmental Potential Atlas was consulted. In addition, the South African Heritage Resources Agency (SAHRA) and the National Archives of South Africa (NASA) databases were also accessed as well as aerial photographs, topocadastral and other maps were studied.

The field survey was done according to generally accepted archaeological practices and was aimed at locating all possible sites, objects and structures (Van Schalkwyk J, 2008). The area that had to be investigated was identified by Knight Piésold (Pty) Ltd by means of maps and relevant coordinates. The dam was visited and a route was followed by driving and by foot around the dam. Special attention was given to hills, outcrops, clusters of trees and streams.

All sites, objects and structures that are identified are documented according to the general minimum standards accepted by the archaeological profession. Coordinates of individual localities are determined by means of the Global Positioning System (GPS) 1 and plotted on a map. This information is added to the description in order to facilitate the identification of each locality. Map datum used: Hartebeeshoek 94 (WGS84).

5.10.2 Results

Regional Overview

Very little archaeological research has been done in the region. The information is mostly derived from the work of Derricourt (1977), but is supplemented where possible with other sources.

The region has been inhabited by humans at least since the Later Stone Age (LSA) times. This is based on the occurrence of a number of sites containing rock art located to the north of the dam named Elucwecwe, Qumanco and Tsakana (Van Schalkwyk J, 2008). Iron Age people started to settle in southern Africa c. AD 300, with one of the oldest known sites at Silver Leaves south of Tzaneen dating to AD 270. Having only had cereals (sorghum, millet) that need summer rainfall, Early Iron Age (EIA) people did not move outside this rainfall zone, and neither did they occupy the central interior highveld area.

The occupation of the Eastern Cape region did not start much before the 1500s, although recent research (e.g. Binneman, 1996; Nogwaza, 1994 and Prins & Granger, 1993) indicates that it started during the 1st millennium. Derricourt (1977) investigated a number of sites in the Middeldrift area that he attributed to the Iron Age. Of course, the Late Iron Age also continues into modern times with the occupation of the area by the Nguni-speakers currently occupying the region (Van Schalkwyk J, 2008).

White settlers moved into the area during the second half of the 18th century. They were largely self-sufficient, basing their survival on cattle/sheep farming and hunting. Few towns were established and it remained an undeveloped area. This was also the area where white colonial expansion came into contact with the African populations, resulting in conflict, as well as the transfer of new ideas.

Survey Results

Stone Age

No sites, features or objects of cultural significance dating to the Stone Age were identified in the study area.

Iron Age

No sites, features or objects of cultural significance dating to the Iron Age were identified in the study area.

Historic Period

No sites, features or object of cultural significance dating to the historic period were identified in the study area.

Proposed Rock Quarry Area

No sites, features or objects of cultural heritage significance were identified in the vicinity of the borrow pit.

Refer to Appendix D for the Heritage Impact Assessment report for a detailed description of the sites found.

5.11 Social Conditions

The nearest villages, namely Mandlaneni, Mkwezweni and Mahlatir are located approximately 3.3 km, 3 km and 1.2 km away from the dam and quarry. No information is readily available regarding these three villages although it is known that their livelihood consists of communal subsistence farming and private stock farming/grazing, the main activity (DWAF, 2004). The villagers do not use the dam for any purpose.

6. ENVIRONMENTAL IMPACT ASSESSMENT

This chapter addresses the pre-operational, operational and closure phases.

6.1 Pre-operational Phase

The main activities associated with the pre-operational phase are:

- Upgrade of the access road from the dam to the quarry
- Site clearance of the quarry area
- Topsoil stripping and stockpiling
- Employment of local labour

6.1.1 Air Quality

During the pre-operational phase, it is anticipated that the main sources of impacts to air quality will be caused by site clearing during the preparation of the new quarry footprint area.

The ambient air quality will be impacted upon during the pre-operational phase however, the impacts associated with these components is expected to be LOW due to the short-term nature and limited spatial extent of the operational activities during this phase.

6.1.2 Geology

No significant impacts on geology are expected during the pre-operational phase as activities will be limited to surface site clearing.

6.1.3 Soils

During the pre-operational phase, soils will be impacted on by the site clearing activities which will involve vegetation and topsoil stripping at the access road and quarry sites. The impact on the soils stripped during the pre-operational phase will be MODERATE as it is confined to the site and is reversible after the operational phase is complete.

Erosion of soils may result from steep gradients of the stockpiles. This impact has the potential to be LOW, limited to the operational phase and reversible with human intervention. The management of stockpiles is described in Chapter 7.

Soils may be contaminated through accidental spills and leaks from vehicles and equipment. This impact is considered to be LOW.

6.1.4 Land Use

During the pre-operational phase, only limited areas will need to be cleared for use for the rehabilitation of the access roads and for the open quarry. The affected land is owned by the DWAF, however, the land will be rehabilitated as far as practicably possible, using indigenous vegetation.

6.1.5 Surface Water

Site clearing activities have the potential to alter the physical habitat of the aquatic ecosystem and contribute to the siltation of the river downstream of the dam by the runoff of terrestrial sediments into the river. This impact is considered to be LOW due to the proposed quarry footprint which falls outside of the 1:100 year floodlines of watercourses on site, and therefore should minimise activity in the river beds.

Surface water may be contaminated through accidental spills and leaks from vehicles and machinery. This impact is considered to be LOW.

6.1.6 Groundwater

During the pre-operational phase, no groundwater impacts are expected.

6.1.7 Fauna and Flora

Site clearing activities will have high negative long term impacts on the extant flora on and immediately adjacent to the site. Burrowing animals and reptiles are most likely to suffer moderate short term declines in their populations. However, if all the mitigation measures

outlined in the EM Programme chapter are followed, there is an increased possibility that positive long term outcomes are achievable.

The removal of the above ground flora and the topsoil will lead to:

- A reduction and fragmentation of suitable habitat for many small animals and this negatively impacts the various populations of biota within the area
- Loss of vegetation cover will lead to an increase in soil erosion
- Front-end loaders and other earthmoving equipment are predicted to cause a number of mortalities and injuries to small animals.

There will be an increased number of mortalities due to vehicle traffic but this impact is rated as LOW and short-term.

6.1.8 Heritage Resources

The significance of a heritage site and artefacts is determined by its historical, social, aesthetic, technological and scientific value in relation to the uniqueness, condition of preservation and research potential. It must be kept in mind that the various aspects are not mutually exclusive, and that the evaluation of any site is done with reference to any number of these (Van Schalkwyk J, 2008).

No sites, features or objects of cultural heritage significance were identified in proximity of the Tsojana Dam basin or in the vicinity of the proposed borrow pit therefore there is no impact.

6.1.9 Socio-economic Impacts

The potential for limited employment is anticipated. The percentage of locals employed will be decided on by the Contractor. This impact will be positive, short term and is considered to be LOW.

No traffic problems are anticipated as the access road to the quarry is not accessible to the public.

6.1.10 Aesthetics

Site clearing activities will impact on the visual quality of the site. This impact is considered as having a LOW significance.

6.1.11 Noise and Vibration

Vehicles and equipment used for site clearing activities will generate some noise and vibration, but this will be limited to the site. This impact is considered as having a LOW significance, due to the distance of the quarry from any settlements or residential areas.

6.2 Operational Phase

The main activities associated with the operational phase are:

- Drilling and blasting of rock
- Crushing and screening of excavated rock on site
- Loading and haulage of excavated material
- Maintenance of the access road

6.2.1 Air Quality

During the operational phase, stripped soils and stockpiles will be susceptible to wind erosion, which will be aggravated by vehicle-entrained dust emissions. The drilling, blasting, haulage, crushing and screening activities will also create dust. The resultant dust will not pose a nuisance to neighbouring communities, due to their distant location from the quarry. Dust generated should be mainly confined to the quarry area and therefore the overall impact to air quality will be LOW.

6.2.2 Geology

The geology of the site will be disturbed by surface quarrying. This impact will be permanent, but will be limited to the site and is considered to be of a HIGH significance.

6.2.3 Soils

The excavation of the materials and the need for soils and waste rock to be stripped in order to expose the viable materials, will continue to impact on the topsoils and subsoils in the immediate vicinity of the quarry area. This impact will be HIGH, irreversible, will continue for as long as the dam construction period but will be confined to the site.

Maintenance of the access road is ongoing and will impact on soils throughout the operational phase. This impact is MODERATE, will be confined to the site and is recoverable once the operational phase has been completed.

The compaction of soils due to the haulage of raw materials by road and the potential for spills of contaminants from fuelled vehicles such as oil or fuel, will impact on soils negatively. This impact has been rated as having a MODERATE overall significance and will be medium to long term in nature.

Proper management of all soil stockpiles as detailed in Chapter 7 will need to be implemented in order to prevent wind and water erosion and the potential compaction of soils while in storage. The impact of these activities will be confined to the site, short term and will be recoverable with human input. This impact has therefore been rated as having a MODERATE overall significance.

6.2.4 Land Use

As there is an existing quarry, and the footprint of the proposed quarry will not alter the land use significantly, this impact is considered as having a MODERATE overall significance as it will however be permanent.

6.2.5 Surface Water

Surface water could be impacted on by spill and leakages from construction vehicles and machinery. This impact has been rated as having a MODERATE significance.

If the water from the settling pond is to be discharged to the environment, the water quality should meet the waste water limit values according to the General Authorisation (GN no. 399, S. 21(f) and (h), 2004). This impact has been rated as having a LOW significance after mitigation.

6.2.6 Groundwater

Groundwater is not anticipated to be impacted on as the quarry will cut into the hillside and the creation of a pit is not expected. The quarry will therefore not reach the water table and the water quality will not be affected.

6.2.7 Fauna and Flora

The blasting of the rock will lead to a reduction in habitat, resulting in the death of numerous small rock dwelling animals in the rock crevice. The numbers will increase the longer the rock is left exposed. This impact is considered to be LOW, of short duration and confined to the quarry site.

Machinery in the process of rock crushing and the transportation and removal of rock material could lead to accidental injury and death to small animals within the quarry and

along the access road from the quarry to the dam. This impact is anticipated to be of LOW significance, of short duration and reversible with human intervention.

6.2.8 Heritage Resources

No sites, features or objects of cultural heritage significance were identified in proximity of the Tsojana Dam basin or in the vicinity of the proposed borrow pit therefore there is no impact.

6.2.9 Socio-economic Impacts

The potential for limited employment is anticipated. The percentage of locals employed will be decided on by the Contractor. This impact will be positive, short term and will have a LOW significance.

Traffic is not expected to be disrupted as the public is not authorised to utilise the access road.

6.2.10 Aesthetics

Excavation of material during quarrying will continue to have a visual impact. The more material is excavated and the quarry is increased in size, the more significant the visual impact. This impact is considered to be of HIGH significance and irreversible.

6.2.11 Noise and Vibration

Ambient noise levels around the potential quarry site is relatively low as the land is primarily vacant land. Blasting will increase the ambient noise level, however, this is expected to have a MODERATE significance as the nearest towns or communities are located more than 1 km away.

6.3 Closure Phase

During the closure phase, the main activities associated with the phase are:

- Removal of surface infrastructure
- Earthmoving operations for rehabilitation
- Topsoiling and re-vegetation operations
- Unemployment of local labour

During the closure phase, the impacts would be limited to the activities associated with the physical rehabilitation of the quarry, which will include removal of structures, ensuring the

safety of the pit area to prevent people and animals from falling down the slopes of the quarry.

6.3.1 Air Quality

Dust will be generated during earth moving operations for rehabilitation purposes. This would, however, be short term and will have a positive impact on the air quality once vegetation on the open pit is established. This impact has therefore been rated as having a LOW overall significance.

6.3.2 Geology

No further impact to geology will occur during the closure phase. However the disturbed geology will remain an impact of HIGH overall significance.

6.3.3 Soils

Ongoing rehabilitation during the closure phase of the project will bring about a long-term positive and LOW impact on the soils.

6.3.4 Land Use

The land will be rehabilitated as far as practicably and economically possible to the pre-quarrying land use. The quarry will be free-draining. This positive impact will be limited to the site and will have a HIGH significance.

6.3.5 Surface Water

During the closure phase, the rehabilitation activities should not impact any further on the surface water quality in the form of accidental spills which could contaminate water. The quarry will be rehabilitated to be free draining.

6.3.6 Groundwater

No groundwater impacts are expected as rehabilitation activities will be limited to the surface.

6.3.7 Fauna and Flora

Removal of waste material (that could potentially contaminate the soil and water and lead to the accumulation of toxins in the ecosystem) enhances the re-vegetation of the quarry. This impact is considered positive and has a MODERATE significance.

During the replacement and grading of soils on the site there is a LOW possibility that earthmoving equipment may accidentally injure or kill small animals. This impact will be confined to the quarry site and be of a short duration. However, this activity will also result in the enhancement of ecological succession process which will be positive, long-term and is considered as having a HIGH overall significance.

6.3.8 Heritage Resources

No sites, features or objects of cultural heritage significance were identified in proximity of the Tsojana Dam basin or in the vicinity of the proposed borrow pit therefore there is no impact.

6.3.9 Socio-economic Impacts

There will be a social impact of increased unemployment once the mining operations have ceased. Retrenchment will lead to a loss of household incomes in the area, a decrease in buying power and lowering of living standards. This negative impact is considered as a having a LOW overall significance.

6.3.10 Aesthetics

The site will be rehabilitated and re-vegetated to a state, as close as practicably and economically possible to the surrounding area. All of the surface infrastructure will be removed. This positive impact is considered to be of MODERATE significance, limited to the site and is permanent in nature.

6.3.11 Noise and Vibration

The impact of noise due to vehicles and equipment used for rehabilitation activities would be limited to the immediate area. Once the quarry is closed, no additional noise will be generated and this will have a positive, LOW impact. The vibration impact is also expected to be LOW due to the distance of the mine from settlements which are located more than 10 km away.

7. ENVIRONMENTAL MANAGEMENT PROGRAMME

This chapter provides an overall management plan to prevent, minimise and mitigate all the significant impacts discussed in the Impact Assessment chapter. This plan is presented in table form and is designed to act as a stand-alone document, if required. Each phase of the project has been broken down into the main site activities. From these activities, potential impacts have been identified, along with management measures as discussed in the preceding chapter. This is followed by recommended monitoring plans.

Table 8: Environmental Management Programme

Activities	Aspect	Impact	Mitigation measures
Pre-operation phase			
Air Quality			
Site clearing	Exposing surfaces	Nuisance dust and particulate generation	<ul style="list-style-type: none"> • The area to be disturbed should be kept to the minimum • Access roads should be kept to a minimum and, where possible, existing tracks should be used • Vegetation should only be removed where topsoil stripping is required • Dust suppression methods should, where logistically possible be implemented on open areas that are exposed for long periods of time.
Soils			
Soil stripping	Presence of watercourses and steep gradients	Erosion	<ul style="list-style-type: none"> • Watercourses and steep gradients should be avoided as far as practicably possible • Where steep gradients cannot be avoided, roads should be constructed along contours and not across (directly down), to reduce runoff and erosion.
	Soil management	Loss of soil	<ul style="list-style-type: none"> • Soil should be stripped effectively during the winter months to maintain structural integrity • The topsoil should be stripped to a depth of 250 mm and the lower subsoil to a depth of 400 to 500 mm in sequence and stockpiled separately • Stripped topsoil and subsoil should be stored in stockpiles and berms created around them. The maintenance of these soil storage facilities is especially important in the construction and operational phases • Topsoil should be stockpiled no more than 1,5 m high with a slope of 1:4 and vegetated for the life of the operation.

Activities	Aspect	Impact	Mitigation measures
Creation of access road	Vehicles using roads`	Compaction of soils	<ul style="list-style-type: none"> • Vehicles should not deviate from the dedicated access roads.
Operation of vehicles and machinery	Spillages and leakages	Soil pollution	<ul style="list-style-type: none"> • Vehicles and machinery shall be kept in good working order and oil or fuel leaks will be fixed immediately upon detection, in a dedicated vehicle maintenance area (off-site) • Spills shall be cleaned up immediately • Spill kits should be made available in/or close to the working area. The employees should be trained to use it in cases of emergencies
Land use			
Change of land use	Loss of natural environment	Habitat destruction and disturbance	<ul style="list-style-type: none"> • The area to be disturbed should be kept to the minimum • The area should be rehabilitated at closure
Surface Water			
Runoff from cleared surfaces	Inadequate drainage and erosion protection	Sedimentation of watercourses	<ul style="list-style-type: none"> • Adequate drainage and erosion protection in the form of cut-off berms or trenches should be provided where necessary • Work should be undertaken during dry months if possible
Operation of vehicles and machinery	Spillages and leakages	Surface water contamination	<ul style="list-style-type: none"> • Vehicles and machinery shall be kept in good working order and oil or fuel leaks will be fixed immediately upon detection, in a dedicated vehicle maintenance area (off-site) • Spills shall be contained and cleaned up immediately • Spill kits should be made available in/or close to the working area. The employees should be trained to use it in cases of emergencies
Fauna & Flora			
Creation of access road	Removal of vegetation	Destruction of flora and fauna habitat	<ul style="list-style-type: none"> • Engineer or vegetation specialist should create awareness through training in order to prevent the trapping and injuring of fauna.

Activities	Aspect	Impact	Mitigation measures
Site clearing	Removal of vegetation	Destruction of flora and fauna habitat	<ul style="list-style-type: none"> • Alien vegetation should be dug up and left on exposed rock to dry out • Inform Reptile Atlas Project when topsoil is removed to record reptiles and amphibians that occur beneath the soil. • Awareness training should be given to employees to prevent injury or death to fauna, because of trapping.
Heritage Resources			
Site clearing	Removal of vegetation	Disturbance of potential historically important sites	<ul style="list-style-type: none"> • The Contractor and workers should be notified that archaeological sites might be exposed during the construction work • Should any heritage artefacts be exposed during excavation, work on the area where the artefacts were discovered shall cease immediately and the Engineer shall be notified as soon as possible • All discoveries shall be reported immediately to a museum, preferably one at which an archaeologist is available, so that an investigation and evaluation of the finds can be made. • Acting upon advice from these specialists, the Engineer shall advise the necessary actions to be taken • Under no circumstances shall any artefacts be removed, destroyed or interfered with by anyone on the site • Contractor and workers shall be advised of the penalties associated with the unlawful removal of cultural, historical, archaeological or paleontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51. (1).
Aesthetics			
Site clearing	Loss of vegetation and topsoil	Reduction of visual quality	<ul style="list-style-type: none"> • Limit site clearing as far as possible
Noise			
Operation of vehicles and machinery	Poorly maintained vehicles and machinery	Noise	<ul style="list-style-type: none"> • Vehicles and machinery shall be kept in good working order • Operations will be restricted to normal working areas and hours

Activities	Aspect	Impact	Mitigation measures
Socio-Economic			
Site clearing and construction	Labour required	Job creation	<ul style="list-style-type: none"> Labourers shall be sourced from the surrounding communities as far as possible
Site clearing and construction	Labourers on site	Social problems (theft, poaching, drug & alcohol abuse, etc)	<ul style="list-style-type: none"> Contractor shall take disciplinary action against his workmen when necessary
Operational Phase			
Air Quality			
Vehicle usage, drilling, blasting and haulage	Exposed surfaces	Nuisance dust and particulate generation	<ul style="list-style-type: none"> Speed limits should be enforced When loading the haul trucks, the fall height of the material should be kept to a minimum The truck load, once full shall either be wet or covered. This will reduce the amount of dust and material lost during transport. This shall also be applied to drop-off and operational storage piles. Dust suppression methods shall, where logistically possible, be implemented on open areas that are exposed for long periods of time.
Crushing and screening	Mobilisation of dust	Nuisance dust and particulate generation	<ul style="list-style-type: none"> Crushing and screening machines should be fitted with dust minimisation screens
Soils			
Further soil stripping and excavations	Management of stockpiles	Loss of soil	<ul style="list-style-type: none"> Any further soil stripping during this phase of the project will require the handling and management of topsoil and subsoil as detailed above Stockpiles shall be vegetated Plants shall be weeded regularly, and watered if necessary at first to establish rooting
Operation of vehicles and machinery	Spillages and leakages	Soil pollution	<ul style="list-style-type: none"> Prevention and handling of spillages should be undertaken as detailed above
			<ul style="list-style-type: none"> Spills shall be contained and cleaned up immediately

Activities	Aspect	Impact	Mitigation measures
Surface water			
Runoff from cleared surfaces	Inadequate drainage and erosion protection	Sedimentation of watercourses	<ul style="list-style-type: none"> Adequate drainage and erosion protection in the form of cut-off berms or trenches shall be provided where necessary and maintained
Operation of vehicles and machinery	Spillages and leakages	Surface water contamination	<ul style="list-style-type: none"> Prevention and handling of spillages shall be undertaken as detailed above.
Water collected in settling pond	Storage and discharge of contaminated water	Surface water contamination	<ul style="list-style-type: none"> If the water from the settling pond is to be discharged to the environment, the water quality must meet the waste water limit values as stipulated in the General Authorisation (GN 399, S 21 (f) and (h)).
Fauna & Flora			
Workers residing at construction camp	Cooking and heating	Accidental fires	<ul style="list-style-type: none"> Designated smoking and cooking areas in order to prevent fires
Blasting and crushing	Noise	Disturbance of nesting birds	<ul style="list-style-type: none"> Blasting and crushing shall be done during daylight hours so as not to disturb nesting birds
Transportation of material	Accidental killing of animals	Accidental killing of animals	<ul style="list-style-type: none"> Trucks shall use their headlights when transporting material during the day
Heritage Resources			
Quarry operations	Exposure of archaeological sites	Disturbance of potential historically important sites	<ul style="list-style-type: none"> Continued care should be taken to observe discovery of any sites of heritage significance during operation. Should any archaeological artefacts and paleontological remains be exposed during operations, work on the area where the artefacts were found, shall cease immediately and the Engineer shall be notified as soon as possible Upon receipt of such notification, an Archaeologist or Palaeontologist shall investigate the site as soon as practicably possible. Acting upon advice from these specialists, the necessary actions shall be taken

Activities	Aspect	Impact	Mitigation measures
Quarry operations	Exposure of archaeological sites	Disturbance of potential historically important sites	<ul style="list-style-type: none"> Under no circumstances shall archaeological or paleontological artefacts be removed, destroyed or interfered with by anyone on the site during operations The Contractor shall advise its workers of the penalties associated with the unlawful removal of cultural, historical, archaeological or paleontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51(1).
Socio-Economic			
Operation of the quarry	Labour required	Job creation	<ul style="list-style-type: none"> Labourers shall be sourced from the surrounding communities as far as possible
Operation of the quarry	Labourers on site	Social problems (theft, poaching, drug & alcohol abuse, etc)	<ul style="list-style-type: none"> Contractor shall take disciplinary action against his workmen when necessary
Aesthetics			
Operation of the quarry	Quarry footprint	Further reduction of visual quality	<ul style="list-style-type: none"> No mitigation possible
Noise and Vibration			
Operation of vehicles and machinery	Maintenance of vehicles and machinery	Noise	<ul style="list-style-type: none"> Vehicles and machinery shall be kept in good working order Operations shall be restricted to normal working areas Speed limits shall be enforced
Blasting	Regulation of explosives usage	Noise	<ul style="list-style-type: none"> A blasting schedule shall be drawn up and adhered to All explosives will be handled and managed according to the Explosives Act, (2003) Act 15 of 2003, and the applicable Regulations promulgated under this Act
Closure			
Air Quality			
Earthmoving operations	Exposed surfaces	Nuisance dust and particulate generation	<ul style="list-style-type: none"> Dust minimisation and suppression shall be undertaken as detailed above

Activities	Aspect	Impact	Mitigation measures
Soils			
Replacing, ripping, fertilizing and seeding soils	Re-vegetation of disturbed area	Stabilise soils	<ul style="list-style-type: none"> The topsoil and sub-soil horizons shall be replaced in the correct order (reverse order) Ripping is only recommended for the wet based and clay rich soils (dark or grey structured soils) The area shall be fertilised and seeded
Land use / Aesthetics			
Rehabilitation of disturbed area	Re-use at disturbed area	Return to near wilderness area	<ul style="list-style-type: none"> Any surface infrastructure will be demolished, and foreign objects removed and disposed of to appropriate permitted landfill site/s The quarry will be backfilled with any stockpiled material remaining The disturbed areas will be sloped, topsoiled and vegetated using indigenous plant species The sides of the quarry will be graded to a safe angle and be free-draining
Fauna & Flora			
Seeding	Re-establish natural vegetation	Re-establish natural vegetation	<ul style="list-style-type: none"> After rehabilitating the soil, it shall be seeded with local species of <i>Asteraceae</i>, <i>Fabaceae</i>, <i>Cyperaceae</i> and <i>Poaceae</i> Monitor the seeded area until vegetation has been re-established (at least 70% cover)
Heritage Resources			
Closure of quarry	Exposure of archaeological sites	Disturbance of important heritage sites	<ul style="list-style-type: none"> Continued care should be taken to observe discovery of any sites of heritage significance during operation. Should any archaeological artefacts and paleontological remains be exposed during operations, work on the area where the artefacts were found, shall cease immediately and the Engineer shall be notified as soon as possible

Activities	Aspect	Impact	Mitigation measures
Closure of quarry	Exposure of archaeological sites	Disturbance of important heritage sites	<ul style="list-style-type: none"> • Upon receipt of such notification, an Archaeologist or Palaeontologist shall investigate the site as soon as practicably possible. Acting upon advice from these specialists, the necessary actions shall be taken • Under no circumstances shall archaeological or paleontological artefacts be removed, destroyed or interfered with by anyone on the site during operations • The Contractor shall advise its workers of the penalties associated with the unlawful removal of cultural, historical, archaeological or paleontological artefacts, as set out in the National Heritage Resources Act (Act No. 25 of 1999), Section 51(1).
Socio-Economic			
Closure of quarry	Labour not required	Unemployment	<ul style="list-style-type: none"> • The quarry is expected to generate only limited employment during the operational phase. The loss of employment is therefore expected to have a low significance. No real mitigation will be possible.
Noise and vibration			
Earthmoving operations	Generation of noise	Noise	<ul style="list-style-type: none"> • Work shall be restricted to the normal operating hours

8. PUBLIC PARTICIPATION

The public participation process is described below, as are the concerns that have been raised by those parties who have an interest in the proposed project.

The condition upon which this report is made public is stated in terms of Regulation 27 to 36 compiled in terms of Chapter 5 of the National Environmental Management Act, 1998 (Act no. 107 of 1998), of the Department of Water Affairs and Forestry.

8.1 Public Participation Process

The PP process was undertaken for the entire project namely the upgrading of Tsojana Dam as well as the quarry operations. The PP process is therefore described below:

Identification of Interested and Affected Parties

I&APs are defined as persons or institutions who have registered with the independent consultant and who have an interest in or objection to the proposed project. The public participation process followed forms part of the Environmental Impact Assessment (EIA) process has been adopted that is governed by NEMA and this process. This process included the following:

- On site notices were placed at the Tsojana Dam site (Refer to Appendix E for the photos taken)
- An I&AP database was developed. The database included:
 - Community/residents and tenants associations
 - Ward Councillors
 - All neighbours of the site
 - Local authorities
 - Ward committee members (in all surrounding areas)
- Information documents and reply forms were handed out to the councillor of the area where Tsojana Dam is situated. The information document provided a brief background and description of the project and the reply forms allowed the public to register as an I&AP and to raise any issues and concerns regarding the project. A focus group meeting for this project was held at Mgxobhoxweni Community Hall, Cofimvaba on 19 March 2008 at 14h30.
- Refer to Appendix E for the attendance register, Background Information Document, notice of public participation process, minutes of the meeting held, public participation presentation and Issues and Concern sheets.

8.2 IAP Issues and Concerns

Refer to Table 9 below for the IAP Issues and Concerns Register for the whole project which includes the upgrading of Tsojana Dam as well as the quarry operations.

Table 9: IAP Issues and Concerns Register

Issue/Comment/Question	Raised By	Date	Response
Will local contractors be used for the construction of the project?	Mr S. Sidloyi (Community Policing Forum Chairperson)	19 March 2008 (Focus Group/Councillors and Ward Committee Members)	N Pilz (Knight Piésold): It will be stated in the tender document that a certain percentage of local labour will be used however; we do not know what the percentage is at this point in time since this will be decided on closer to the construction time. Local contractors will have an opportunity to tender for the job.
Will disabled people be able to benefit from the project in terms of employment opportunities?	Mr S. Sidloyi	19 March 2008 (Focus Group/Councillor, Ward Committee Members and Inkosi Ndamase)	N Pilz (Knight Piésold): With regard to the disabled people, it is not easy to tell as the tender documents have not yet been finalized. However, we are hoping that the contractor will have this issue taken care of.
Is there a possibility of having a site visit with DWAF, Knight Piésold and community members to explain the proposed Tsojana Rehabilitation project?	Mr S. Sidloyi	19 March 2008	Z Dlamini (Knight Piésold): Unfortunately we are a consulting company appointed by a government Department to design and facilitate approvals for the proposed rehabilitation work. It is unlikely that we will be able to undertake another site visit. The background information document has all the necessary information on it with regard to the project.

Issue/Comment/Question	Raised By	Date	Response
How are you going to get the information about the current baseline environment?	Mr S. Sofika (Ward Committee Member)	19 March 2008 (Focus Group/Councillors and Ward Committee Members)	T Manzoni (Knight Piésold): We have appointed specialists that will be going out to the site very soon to do an assessment of the area in order to obtain baseline information. These include fauna, flora and archaeological specialists. Once finished with their work, they will prepare and send the reports to us with their findings which will be incorporated into the final EMPR to be submitted to DME.
When is the work going to start on site?	Mr M. Pukwana (Ward Committee Member)	19 March 2008 (Focus Group/Councillors and Ward Committee Members)	N Pilz (Knight Piésold): We need to submit the EMPR to the DME for approval. This report will detail and include all the specialist reports including the minutes of this meeting and your comments. Once the report has been approved, then work will start on site, probably in February 2009 which will last for about 6 to 8 months.
What are the mitigation measures to ensure that the water is not polluted because the community uses the water from the river below the dam? Are there any chemicals that will be used that are detrimental to human health?	Mr M. Hlobani (Ward Committee Member)	19 March 2008 (Focus Group/Councillors and Ward Committee Members)	N Pilz (Knight Piésold): The temporary bridge will be built over the existing chute below the spillway. This will therefore not affect the water quality during construction. DWAF is also looking at an alternative of using the old road above the dam for the duration of construction.

Issue/Comment/Question	Raised By	Date	Response
How are they going to guarantee safety of road users during construction?	Mr M. Hlobani	19 March 2008 (Focus Group/Councillors and Ward Committee Members)	The contractor will have people manning the road. They will work on a stop and go basis and there will be signs to facilitate smooth flow of traffic during the construction period.
In closing, on behalf of the community of Intsika Yethu, we would like to commend Knight Piésold for their approach and professionalism in ensuring that the public and all role players are well informed of the proposed development. Thank you people.	Mr S. Sidloyi	19 March 2008 (Focus Group/Councillors and Ward Committee Members)	Noted.

9. EMERGENCY RESPONSE PLAN

9.1 Terminology

The quarry – the area where quarrying activities take place.

Receiving environment – the receiving environment is the air, water, soil, vegetation and animals which can, or will be, impacted on by an incident.

Environmental Impact - Any change to the environment, whether adverse or beneficial, wholly or partially resulting from the operational activities.

Pollution - is seen as any change in the environment caused by:

- Chemical substances
- Radioactive substances
- Noise, odours, heat or light
- Mechanical land disturbance

Emergency- is defined as any

- Unplanned spill or release of a harmful substance to the environment
- Natural disaster such as flooding or fire
- Significant wastage of resources or unplanned physical damage to the environment.

Note: Depending on the toxicity of the substance, any spill of 100 litres or more can be seen as an emergency.

As a general rule of thumb any oil, petrol or diesel spill onto soil larger than 100 litres is an emergency. All spills must be addressed as soon as possible.

Root cause – the root cause of an incident is the actual reason why an incident and/or accident occurred. Causes can usually be divided into:

- Equipment failure
- People failure (e.g. negligence on the part of personnel)
- A failure in the system (e.g. personnel not correctly trained to carry out the work being conducted at the time of the incident)
- No procedures were in place that could have prevented the incident from happening.

Emergency Coordinator - the Emergency Coordinator will be the most senior person on duty in charge of the area affected by an emergency. For this project, it will be the Engineer. The Engineer will also take charge of the evacuation process at the site.

Emergency Assembly Point - This will be an identified place where all personnel must assemble for roll call after evacuation.

9.2 Objectives

DWAF is committed to implementing a policy of zero harm to the environment and the people living in this environment and will strive to reach the following objectives from the commencement of the proposed quarry activities:

- Prevent threats to human health and livelihoods in the adjacent villages and the surrounding areas
- Inform the adjacent and local communities adequately to ensure a fast and effective response to an incident
- Prevent accidental releases of chemicals into the receiving environment
- Prevent, minimise and mitigate incidents due to transportation accidents
- Prevent and minimise physical damage to equipment, property and farmland
- Ensure that normal operations can be continued as soon as possible in the event of an incident
- Evacuate, should it be necessary, the personnel in an orderly and coordinated manner
- Implement an effective system to receive, record and communicate reports of environmental incidents and emergencies
- Ensure that all environmental incidents/or emergencies are investigated and the necessary actions are taken to implement corrective and preventative actions
- Determine the root cause of each incident/accident and ensure that the appropriate measures are taken to prevent a recurrence

9.3 Composition of the Response

9.3.1 Internal Response

Due to the remoteness of the quarry, the Engineer will be responsible for a response to any incident or accident that can, or may, arise at the quarry site. The Engineer will also be responsible for responding to any incident involved with fire from the use of incorrect explosives usage and the accidental spills of any hazardous substances at the quarry site and afterwards be responsible for the clean up and remediation. The Engineer will inform the DWAF Regional Office of any such spills immediately after the incident has occurred.

9.3.2 External Response Team

The External Emergency Response Team members are identified below. These are the people who will be notified if DWAF does not have the capacity to deal with an incident or environmental emergency.