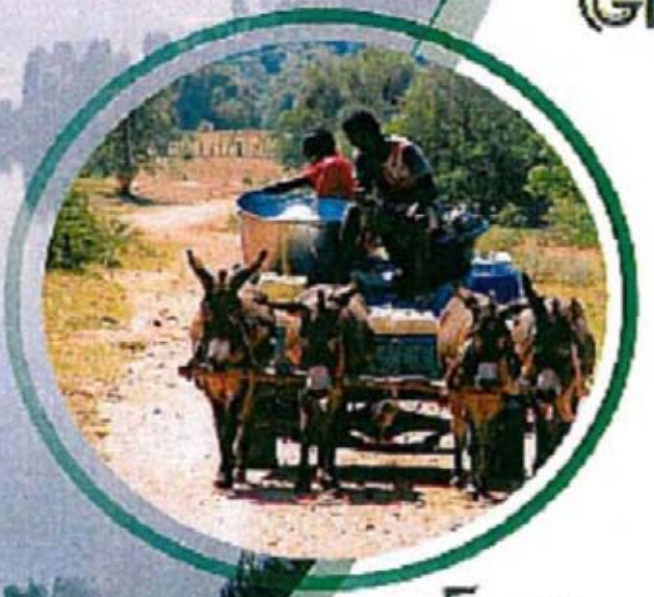
water & forestry

Department:
Water Affairs and Forestry
REPUBLIC OF SOUTH AFRICA

GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)



Environmental Impact Assessment

(DEAT Ref No: 12/12/20/978)

FINAL SCOPING REPORT

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NOVEMBER 2007

REPORT DETAILS PAGE

Project name:	*Groot Letaba River Water Development Project*
Report Title:	*Scoping Report*
Author:	*Terry Baker with input from specialist*
DWAF report reference no.:	*[will be provided]*
PSP project reference no.:	*600298*
Status of report:	*Final*
First issue:	*August 2007*
Final issue:	*December 2007*

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PREFACE

The Department of Water Affairs and Forestry (DWAF) is currently undertaking an Environmental Impact Assessment (EIA) to investigate the environmental feasibility of raising the Tzaneen Dam, the construction of a storage dam in the Groot Letaba River and associated bulk water infrastructure (water treatment, pipelines, pump stations, off-takes and reservoirs) in the Limpopo Province. The EIA is being undertaken by ILISO Consulting (technical aspects) with Zitholele Consulting providing the public participation support. The EIA is being undertaken according to the EIA Regulations under Section 24 (5) of the National Environmental Management Act (NEMA), (Act No 107 of 1998) as amended in Government Notice R385, 386, 387 – Government Gazette No. 28753 of 21 April 2006.

An EIA must show the authorities and the proponent what the consequences of their decisions will be in environmental, economic and social terms. An EIA is comprised of various phases, with the Scoping Phase as the first and key phase. This is the phase during which potential issues associated with the project are scoped and identified in order that technical specialists can evaluate them during the next phase of the EIA, viz. the Impact Assessment Phase.

In accordance with the Regulations of the NEMA, Interested and Affected Parties (members of the public, the development proponent, technical specialists and the authorities) must have the opportunity to verify that all the issues they raised during Scoping have been captured, understood, interpreted and contextualised. This was the main purpose of the Draft Scoping Report and its Summary Report that were available to the public for comment from Wednesday 3 October 2007 to Wednesday 31 October 2007.

The Final Scoping Report is now submitted to the environmental authority, the national Department of Environmental Affairs and Tourism (DEAT) who, in close collaboration with the Limpopo Department of Finance and Economic Development, will review and consider the results of the Scoping Phase and Terms of Reference for the Impact Assessment.

FURTHER INFORMATION IS AVAILABLE FROM THE PUBLIC PARTICIPATION OFFICE

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Appreciation for participation by Interested and Affected Parties (I&APs)

Many I&APs have participated actively during the EIA process by attending meetings, and by taking the time to prepare written submissions. I&APs contributed considerable local knowledge, information on previous studies done in the area. Many also hosted members of the EIA team in their homes or offices, and showed them around the area. The EIA team wishes to express sincere appreciation for these efforts by I&APs.

EXECUTIVE SUMMARY

BACKGROUND

In 1998, the DWAF completed an assessment of various options to improve the management of water available for social and economic development in the Groot Letaba River catchment. Since it was recognised that the water resources of the Groot Letaba River were already heavily committed, a wide range of strategic alternatives were considered to improve the water availability situation in the face of growing needs in the domestic water use sector, deterioration in the conservation status of the river ecology and increasing shortages in the irrigation sector.

The feasibility study indicated that additional storage facilities would provide for a more sustainable solution to the water resource problems. To this end, various alternative storage sites were examined. The outcome of these investigations led to the recommendations that the construction of a new major dam at the site known as Nwamitwa be considered together with improved water management interventions. The raising of the Tzaneen Dam, with the objective of minimising the intensity and consequences of shortages in the irrigation sector, was found to deserve sympathetic consideration. The DWAF is currently reviewing and updating information in this regard and conducting post-feasibility bridging studies to determine whether the recommendations made previously are still relevant and how they should be taken forward.

Environmental authorisation process

Environmental authorisation in terms of Section 24 (5) of the NEMA and other legislation is required before the infrastructure components of the project can be implemented. An EIA process commenced in June 2007 and is expected to be completed in the last quarter of 2008.

The DEAT is the lead authority for the EIA, and will make the final decision on whether the proposed project may go ahead or not, and under what conditions. DEAT will collaborate closely with the Limpopo Department of Finance and Economic Development. DEAT will also use the inputs from other relevant government departments and agencies, for example, the Department of Minerals and Energy (DME), the Department of Land Affairs (DLA), the Roads

Agency Limpopo (RAL), the South African Heritage Resources Agency (SAHRA), and district and local municipalities before making a final decision.

Authorisation in terms of the Minerals and Petroleum Resources Development Act (Act 28 of 2002) will also be required from the DME to use various quarry and borrow areas.

MOTIVATION FOR THE PROJECT

The Groot Letaba Valley falls within the Luvuvhu-Letaba Water Management Area (WMA), one of the 19 WMAs into which South Africa is divided. Faced with water shortages of increasing severity and frequency, the main consumptive users of water (irrigation, forestry, domestic and industrial) have from time to time had to compete for limited supplies by taking extraordinary measures to survive. This has resulted in serious degradation of the riverine ecosystems. Historically the environment was not considered a water user and was not allocated any water from available resources. However, in the Letaba River catchment 14.8 million m^3/annum was allocated, on an ad hoc basis, for release from Tzaneen Dam to the Kruger National Park, but little if any of these releases reached the Park with real beneficial effect.

With the advent of the National Water Act (Act 36 of 1998 NWA), a water allocation or Reserve for basic human needs and for sustaining ecological functioning, has placed a new perspective on water resource management in the Groot Letaba River. It now has to be complemented by a strategy for managing the water resources in a sustainable manner. Proposals for augmenting reliable water supplies from the Groot Letaba River include the construction of a dam on the Groot Letaba River at the site known as Nwamitwa just downstream of the Nwanedzi River confluence as well as the possibility of raising Tzaneen Dam. Bulk infrastructure for the treatment, conveyance and storage of potable water for primary use forms an integral part of the development proposals. Attention is focused on water needs for the increasing human population, for downstream riverine ecosystems (including those in the Kruger National Park) as well as for stabilising commercial irrigation, including the settlement of resource-poor farmers.

The Groot Letaba River Water Development Project (GLeWaP) is a major initiative by DWAF in support of the Limpopo Provincial Government's economic development strategy for the province. The project will have a positive impact on the regional economics and on alleviating poverty. This will mainly be achieved through:

- *Increasing the safe, reliable water supplies for domestic and industrial use;*
- *Minimizing the frequency, intensity and duration of restrictions on the use of water allocated for irrigation of high value crops;*
- *An increase in total household income through stabilising the job market; and*
- *Providing leverage for the equitable distribution of resources.*

The proposed infrastructure will make it possible to improve the management of water resources so as to stop degradation of the conservation status of the riverine ecosystem.

DESCRIPTION OF THE PROJECT

The Groot Letaba River Water Development Project is aimed at improving the management of the water resources in the catchment and consists of non-infrastructure options to manage the available water as well as the construction of infrastructure components. Although only the construction of the infrastructure components require authorisation from the DEAT and are subject to this EIA, they must be seen as being complemented by the non-infrastructure components.

Non-infrastructure options

Non-infrastructure options to make more water available, which do not form part of the project for environmental authorisation, include:

- *Water conservation and demand management, as well as water recycling and re-use: The aim is to ensure that increased efficiency and effectiveness of water use will decrease the growth in the need for new water supply augmentation*
- *Local groundwater resources: The conjunctive use of ground and surface water is promoted. Groundwater resources should be developed incrementally to supply growing needs, supported by ongoing monitoring to ensure sustainable yields and good water quality. The Department will make recommendations to local authorities in this regard.*
- *Removal of invasive alien vegetation: DWAF's Working for Water Programme is actively removing invasive alien vegetation in the Groot Letaba Valley as a means of improving runoff in the river system.*

Infrastructure components of the project

- *Construction of a dam at the site known as Nwamitwa on the Groot Letaba River, downstream of the confluence of the Nwanedzi River. The dam wall could be up to 36 m high and have a gross storage capacity of 144 million m^3. The catchment area of the proposed dam at the site known as Nwamitwa is up to 1 400 km^2 and the Mean Annual Runoff (MAR) is approximately 122,6 million m^3 under natural undeveloped conditions. The estimated increase in system yield is up to 47 million m^3/a after providing for the Reserve.*

- *The R529, D1292 and P43/3 will have to be re-aligned to accommodate the dam.*

- *Raising of the Tzaneen Dam could result in increasing the storage from 157.5 million m^3 up to approximately 203 million m^3.*

- *Upgrading of the water treatment works, and construction of bulk water pipelines and pump stations from the dam for water supply for domestic to communities in the area. Pump stations and reservoirs could each occupy an area of about half a football field.*

- *Borrow areas from which materials required will be sourced.*

- *Construction activities will take approximately 5 years with several construction teams working concurrently in different areas at the proposed dam site and along the pipeline routes.*

- *Residential accommodation for construction staff will be established in the vicinity of the proposed dam or in established towns. Housing, internal roads, water and electricity supply, water treatment, solid waste disposal, emergency facilities and recreational amenities will be provided.*

- *The construction cost of the infrastructure components of the project is estimated in excess of R1 100 million at 2007 prices.*

- *Construction sites will include offices, internal roads, water and electricity supply, waste water treatment, solid waste disposal, emergency facilities, areas for the handling of hazardous substances, workshops, washbays, areas for the safe storage or explosives and communication infrastructure.*

- *Supply of water from proposed Nwamitwa Dam is targeted by 2012 with full yield around 2013. Proposed construction will start in 2009.*

ALTERNATIVES

Several alternatives to the non-infrastructure and infrastructural components of the project were fully investigated and it was confirmed that the proposed project is the preferred option. It should be noted that the non–infrastructure interventions alone, although necessary, cannot achieve the project requirements. The specialist studies will therefore only focus on the proposed project and not on the alternatives. The alternatives investigated included, the following:

Do Nothing option

If no measures are taken to improve management of the water resources in the catchment, there will be shortages for irrigation and other developments and the socio-economic development in the region will be negatively affected. People in some villages in the study area are dissatisfied with the quality of the groundwater that is available and are resorting to collecting water from local rivers. Water collected is not treated introducing potential health risks, social impacts and also impacts on the natural environment. The "no project" option is therefore considered unsustainable as it does not allow for the desired ability to manage and operate the water resource system, and is likely to result in increased negative social, economic and ecological impacts in the Province.

Replacing Commercial Afforestation with Natural Vegetation

The positive impact on flows in the river as a result of the replacement of commercial afforestation would be limited since natural vegetation in the areas is also a significant water user. The undesirable impact on the regional economy and on the local employment that would result from deforestation also negates this option.

Ceasing Export of Water to the Sand River Catchment

An annual allocation of 18,5 million m^3/annum is exported to Polokwane from the Dap Naude Dam and Ebenezer Dam. Polokwane does not have reasonable alternatives for importing water and therefore this option would impact significantly on water supply to the Polokwane area.

Improve Utilization Efficiency of Irrigation Water

Allocations are currently curtailed and irrigators receive 50% of the annual quota as a result of the current drought conditions and low levels of water in storage. The irrigation sector already relies on modern technology and has invested heavily in management and sophisticated equipment to improve water use efficiency. Inefficient flood irrigation methods are rarely encountered in the study area. There is therefore little scope for improvement in this sector.

Decrease Irrigation Allocations

The agricultural sector (fruit orchards dependant on irrigation) and the associated agro-industries provide the majority of employment opportunities in the area. Competition for the limited jobs is fierce and unemployment in the area is high and many people rely on income from family members working in the cities. Decreasing allocations to the irrigation sector will negatively affect employment rates and is therefore not recommended.

Water Loss Management: Domestic and Industrial

Effective management systems to counter water loss can most certainly contribute to the increased availability of water. Maintenance tasks such as repairs of pipelines must be carried out as part of a comprehensive management system. Estimates, however, indicate that even with optimistic projections, these actions alone will not be sufficient to meet the increasing requirements.

Create additional storage

The objective of creating additional storage (in the form of a dam) is to improve effective water management in the catchment. This would be achieved by, inter alia, being able to regulate runoff from important tributaries downstream of Tzaneen Dam, minimizing losses when the river is used as a conveyance and reallocate resources between river reaches. The following alternative sites for additional storage were investigated:

- ***The raising of the Tzaneen Dam** (now under further investigation);*
- *Constructing a dam at other sites including at Hobson's Choice in the Letsitele River (not economically viable); and*

- ***The Nwamitwa Dam*** *(now under further investigation)*

Alternatives to the proposed project have been fully investigated and confirm that the proposed project is the preferred option. The specialist studies will therefore only focus on the proposed project and not investigate the alternatives.

DESCRIPTION OF THE RECEIVING ENVIRONMENT

Location

The proposed project mainly falls within the Greater Letaba Local Municipality (LIM332), Greater Tzaneen Local Municipality (LIM333), in the Mopani District Municipality (DC33) in the Limpopo Province. Small portions of the study area are in the Greater Giyani (NP331) and the Ba-Phalaborwa (N334) local municipalities.

Geology, Soils and Topography

The geology at the proposed Nwamitwa dam site consists of Goudplaats Gneiss from the Swazian age. Underlying this is granite gneiss and diabase dykes. The rest of the Groot Letaba catchment is made up of granites that result in shallow weathering (less than 10 m) and the soils formed are sandy.

Surface Water and Quality

The Groot Letaba River rises in the western part of the catchment and flows in an easterly direction and has a catchment area of approximately 13 500 km^2. The most important tributaries of the Groot Letaba River in the study area are the Letsitele River and the Nwanedzi River. The water quality in the Groot Letaba River is of a good quality with some deterioration in the lower reaches due to salination from natural sources and nutrient enrichment.

Ecology

The project area covers ten different vegetation types. Applying the precautionary principle, it is estimated that a total of 256 species of Red Data flora and fauna species could potentially occur. Moreover, at least 107 species could be endemic.

Demographic Processes

Settlement patterns in the study area are dominated by small rural villages, where the poorest people live. Communities in the study area live in relatively densely populated areas with Black Africans being the dominant population group. Education levels are generally low. Very few households have direct access to water within either their dwelling or yard. The provision of bulk water supplies to villages is therefore a priority to the affected communities.

Economic Context

The Greater Tzaneen Municipality contributed most of the GDP to the Mopani District in 2006. Agriculture and the irrigation sector in particular is the main base of the economy of the region and provides the major portion of local employment opportunities. The town of Tzaneen is the only provincial growth point in the study area. In the Greater Tzaneen Municipality, nearly 30% of the population are unemployed with unemployment increasing annually. Employment is mostly generated in the agriculture sector, followed by community, personal and social services sector and the wholesale, retail and trade sector.

LAND USE ACTIVITIES

The Groot Letaba River catchment is a highly productive mixed farming agricultural area with high value fruit production dominating, complemented by cattle ranching, game farming, dryland crop production and a variety of other crops produced under irrigation. Most of the roads in the area are poorly maintained. Apart from internal gravel roads, a fair tarred road network links most of the areas within the district. Although an increase is evident, the tourism demand is well below that which could be expected from an area with such outstanding natural potential.

ENVIRONMENTAL SCOPING

Technical process

The EIA is currently in the Scoping Phase i.e. the first step in the EIA process, designed to inform the public, interest groups, affected communities and government agencies of the EIA (including opportunities for public involvement) and to present the proposed actions, alternatives and impacts for public and agency review. The purpose of scoping is to determine the range of alternatives and identify the potentially significant issues to be analysed in the Impact Assessment Phase. The scoping process is also intended to

eliminate detailed study of those issues that are not significant and those issues that have been addressed by prior studies. The scoping process includes the following:

- *Developing alternatives for evaluation, identifying environmental issues to be addressed and defining the project needs and desirability;*
- *Releasing the Draft Scoping Report to the public;*
- *A 30-day public scoping comment period and scoping meetings to present information and receive comments;*
- *Meeting, corresponding, and/or consulting with affected local, regional, and provincial government agencies, affected communities and other organizations regarding issues within their jurisdiction or concern;*
- *Carefully considering written or oral comments made at the scoping meetings or received during the scoping period, and as appropriate, refining the proposed alternatives, issues and impact assessment plan. Preparing this Final Scoping Report that summarizes the results of the scoping process, including comments received, for submission to DEAT.*
- *DEAT will consider all comments received during the Scoping Phase and, in consultation with other agencies, will formulate its comments on the Scoping Report and the next phase of the project.*

Public participation process

Public participation forms an important component of the EIA. The key objective of public participation during Scoping is to help define the scope of the technical studies to be undertaken during the Impact Assessment Phase of the EIA. The EIA for the proposed project was widely advertised and special efforts are being made to obtain contributions of people who may be directly affected. A Background Information Document (BID) in English, Sepedi, XiTsonga and Afrikaans was widely distributed, advertisements announcing the EIA were placed in the media and project notice boards were placed at prominent localities in the study area.

Several meetings were held with landowners, communities, authorities, residents and others during July and August 2007. A period of four weeks was available for public review of the Draft Scoping Report (from Wednesday, 3 October – Wednesday 31 October 2007), during

which the report was presented at public meetings to facilitate review. In addition to the public participation process for the EIA, the Department of Water Affairs and Forestry has initiated several parallel stakeholder liaison initiatives for the project as a whole.

*All issues raised by stakeholders are presented in an Issues and Response Report (**Appendix C**). Once the lead authority for the EIA has approved the Final Scoping Report, the Impact Assessment Phase of the EIA will commence with several specialist studies.*

As stakeholders have raised issues, they have been passed on to the environmental technical team to be addressed in the Specialist Studies during the Impact Assessment. The significance of an impact will be determined by various criteria (nature of impact, extent, duration, intensity and probability of occurrence).

ISSUES AND POTENTIAL IMPACTS

The EIA study team has, with input from the public participation process, identified the following key issues that will require further in-depth investigation by specialists in various disciplines. These in-depth investigations will take place in the Impact Assessment Phase of the EIA.

The proposed infrastructure components of the GLeWaP project are likely to impact on:

River flow (water quantity and quality)

One of the objectives of the project is to make it possible to improve the management of water resources so as to stop degradation of the conservation status of the riverine ecosystem downstream of the dam. If not implemented correctly, a change in the flow and mean annual run-off (MAR) in the Groot Letaba River downstream of the proposed dam site could, however, result in the degradation of aquatic and riparian habitats. Water quality could be affected due to possible eutrophic conditions, increased salinity, and changes in temperature and quantity of water released from the dam. Potential impacts on downstream users (Kruger National Park and Mozambique) must also be considered.

Terrestrial ecology

The proposed project may lead to localised impacts on the ecology resulting from construction activities. Specialist studies should focus on site-specific ecological field surveys and impact assessments in the areas that will be directly affected by construction activities.

Social processes

The proposed project may impact on the size, composition and character of communities and the provision of services in the study area. The demographic profile may be impacted in a positive or negative way.

Economy

Direct and in-direct job opportunities will be created as a result of the construction and maintenance of the proposed dam. The project will mainly have a positive impact on the economy of the area, although a loss of agricultural land may be experienced.

Physical infrastructure

Some existing infrastructure could be impacted on by the proposed project. Any temporary or permanent disruptions in these services must be mitigated.

Public health

The decreased river flow may increase the risk of diseases in the adjacent and downstream communities. The potential benefits of potable water, with improvements in sanitation and hygiene, will increase the overall standard of living.

Heritage resources

Heritage resources may be impacted upon. A heritage assessment is necessary to reduce risks of the loss of these resources.

Relocation of main roads

Main roads in the project area will have to be relocated in the vicinity of the dam basin. This could have significant impacts on traffic flow routes, particularly between residential areas and places of work in the agricultural sector but also for the transportation of agricultural products to markets.

Water rights

Land required for the project includes irrigated orchards and other crops. The future of the water allocations to this land is a major issue and requires a policy directive, bearing in mind compensation costs as well as the impact on the economy in future.

Land acquisition

Land in the basin is under productive permanent orchard crops that require a number of years to be replaced elsewhere to maintain throughput for packhouses and other fruit industries. Land purchase arrangements should be scheduled as early as possible to ensure production continuity.

PLAN OF STUDY FOR IMPACT ASSESSMENT

To evaluate the issues and recommended mitigation measures (measures to avoid or reduce negative impacts, and to enhance positive ones), the Specialist Studies listed below will be undertaken during the next phase of the EIA, the Impact Assessment Phase:

- *Aquatic Ecology;*
- *Water Quality;*
- *Terrestrial Ecology;*
- *Heritage Resources;*
- *Social and Landuse Processes;*
- *Health Impacts;*
- *Economic Processes;*
- *Traffic Impacts;*
- *Visual Impacts;*
- *Noise Impacts; and*
- *Air quality.*

All specialist studies will be undertaken in compliance with regulation 33(2) of GN 385 and will directly address the impacts identified during the Scoping process.

Once the specialist investigations have been completed and the findings and recommendations are integrated, an Environmental Impact Report will be prepared and be made available for public review.

A draft pre-construction Environmental Management Plan (EMP) and a generic construction EMP will be compiled and included in the Environmental Impact Assessment Report. The overall objective of these EMPs will be to present a workable document that explains how to operate and implement environmental protection requirements for construction. An EMP for the operational phase will not be included.

PROGRAMME AND NEXT STEPS

Preparation for the specialist studies has commenced and, pending acceptance of the Terms of Reference in the Scoping Report, will be concluded by April 2008. The draft Environmental Impact Assessment Report is scheduled for public review over a period of 30 days in about April 2008 and, thereafter, it will be finalised for submission to the Authorities.

Environmental Authorisation is anticipated by October 2008, which would enable the Department of Water Affairs and Forestry to commence construction during the second half of 2009.

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ABBREVIATIONS

CAAP	Compensation Assessment and Action Plan
CBO	Community Based Organisation
DM	District Municipality
DEAT	Department of Environmental Affairs and Tourism
DME	Department of Minerals and Energy
DSR	Draft Scoping Report
DWAF	Department of Water Affairs and Forestry
EIA	Environmental Impact Assessment
EIAR	Environmental Impact Assessment Report
EMP	Environmental Management Plan
EMPR	Environmental Management Programme Report
FSR	Final Scoping Report
GDP	Gross Domestic Product
GLeWaP	Groot Letaba River Water Development Project
GLLM	Greater Letaba Local Municipality
GTLM	Greater Tzaneen Local Municipality
I&AP	Interested and Affected Party
IDP	Integrated Development Plan

LP	Limpopo Province
MMSDsa	Mining Minerals and Sustainable Development (Southern Africa)
MDM	Mopani District Municipality
NEMA	National Environmental Management Act (Act 107 of 1998)
NGO	Non Governmental Organisation
NWRS	National Water Resource Strategy
OA	Options Analysis
PCMT	Project Co-ordination and Management Team
PSP	Professional Service Provider
RDP	Reconstruction and Development Programme
SIA	Social Impact Assessment
VIP	Ventilation Improved Pit Latrine
WCD	World Commission on Dams
WMA	Water Management Area

1. STUDY INTRODUCTION

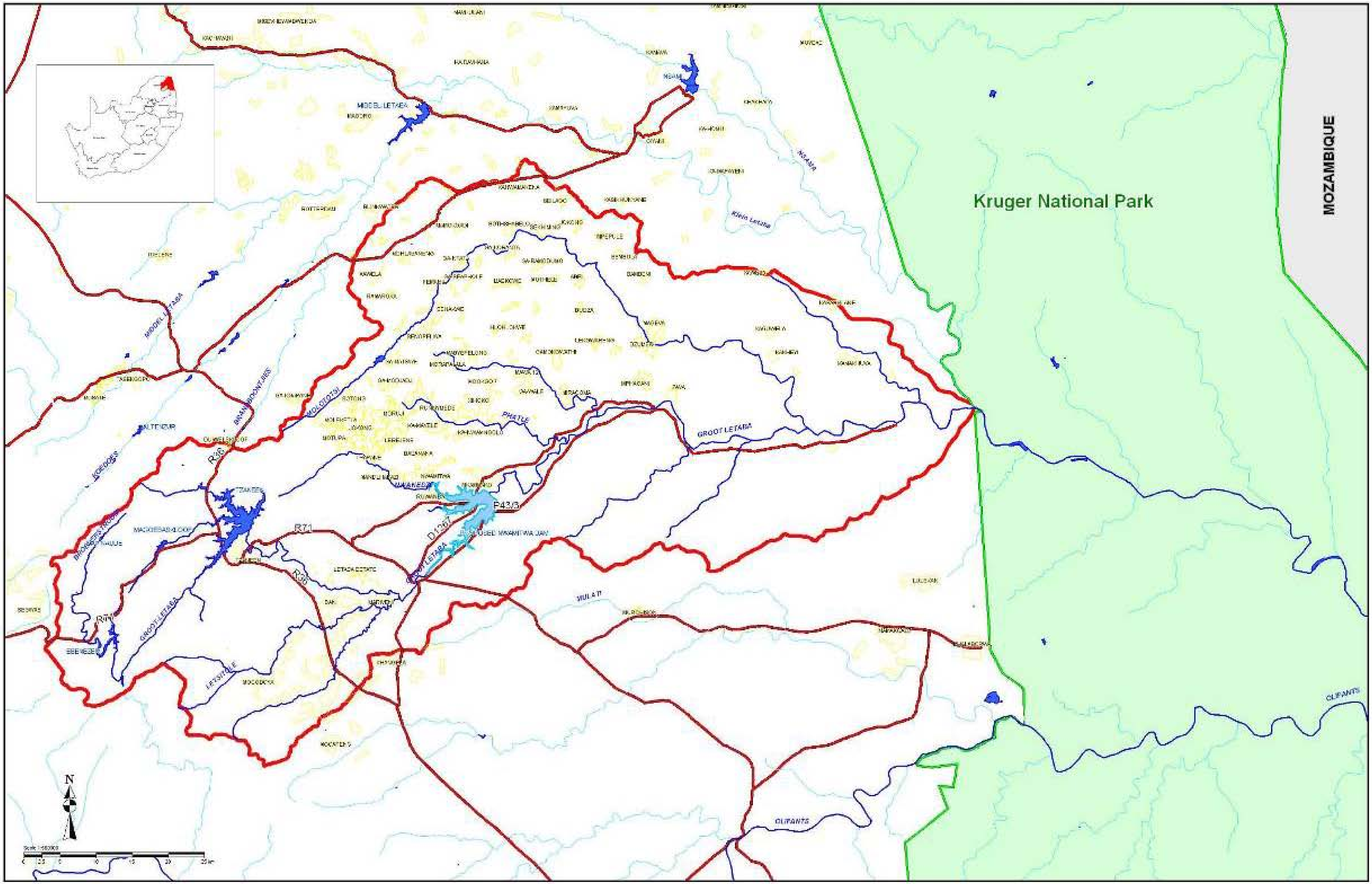
1.1 BACKGROUND TO PROJECT

In 1998, the Department of Water Affairs and Forestry (DWAF) completed an assessment of various options to improve the management of water available for social and economic development in the Groot Letaba catchment (**Figure 1.1**).

Since it was recognised that the water resources of the Groot Letaba River were already heavily committed, a wide range of strategic alternatives were considered to improve the water availability situation in the face of growing needs in the domestic water use sector, deterioration in the conservation status of the river ecology and increasing shortages in the irrigation sector. Consideration was given to the following options at a feasibility level of detail and reliability:

- Replacing commercial afforestation with natural vegetation.
- Ceasing the export of water to the Sand River catchment.
- Improving the utilization efficiency of water used for irrigation.
- Decreasing the water allocated for irrigation use.
- Water loss management in the reticulation systems for domestic and industrial water users.
- Creation of additional storage in the river system to further regulate the river flow.
- Improved water management in all user sectors.

The feasibility study indicated that additional storage facilities would provide for a more sustainable solution to the water resource problems. To this end, various alternative storage sites were examined, namely a site at Hobson's Choice, in the Letsitele River, sites in the Groot Letaba River of which only that at Nwamitwa was found to be reasonable (but not good), and the raising of the Tzaneen Dam.



Legend

- Groot Letaba Catchment
- Kruger National Park
- Towns and Villages
- Roads
- Rivers
- Dams
- Proposed Nwamitwa Dam

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CLIENT

ILISO CONSULTING

PROJECT

GREATER LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)

DRAWING TITLE

LOCALITY MAP

FIGURE 1.1

Date : September 2007

The outcome of these earlier investigations led to the recommendations that construction of a new major dam at Nwamitwa be considered together with improved water management interventions. The raising of the Tzaneen Dam, with the objective of minimising the intensity and consequences of shortages in the irrigation sector, was found to deserve sympathetic consideration. DWAF is now reviewing and updating the needs of this area and post-feasibility bridging studies are being conducted to confirm whether the recommendations made previously are still relevant and how they should be taken forward.

The post-feasibility bridging studies options to be investigated include the construction of a large dam on the Groot Letaba River at the Nwamitwa site, downstream of the confluence of the Nwanedzi River, realignment of the roads to accommodate the dam, construction of water treatment works, bulk water pipelines and pump stations from the dam site to communities in the area and the raising of the Tzaneen Dam wall.

Environmental authorisation in terms of Section 24 (5) of the National Environmental Management Act (NEMA), Act No 107 of 1998 and other legislation is required before the infrastructure components of the project can be implemented. An Environmental Impact Assessment (EIA) process commenced in June 2007 and is expected to be completed in the last quarter of 2008. This document forms part of the EIA series and is the Draft Scoping Report.

1.2 OBJECTIVE OF THE STUDY

An EIA is a planning and decision making tool used to identify potential negative and positive impacts of a proposed project and to recommend ways to enhance the positive impacts and minimise the negative ones. The EIA will address the impacts associated with the project, and provide an assessment of the project in terms of the biophysical, social and economic environments to assist both the environmental authorities (in this case the national Department of Environmental Affairs and Tourism (DEAT)) and the proponent (i.e. the DWAF) in making decisions regarding implementation of the proposed project. The work will be undertaken in compliance with the National Environmental Management Act (No 107 of 1998) (NEMA), specifically Regulations in GN No 385, 386 and 387 of 21 April 2006.

The EIA process will consist of three phases:

- The Scoping Phase;
- The Impact Assessment Phase; and
- The Decision-Making Phase.

1.3 PURPOSE OF THIS REPORT

The main purpose of the Scoping Phase of the project is to identify and define the issues that need to be addressed in the Impact Assessment Phase. Input from the technical team, the authorities, specialists and Interested and Affected Parties (I&APs) is considered and integrated.

The purpose of the Scoping Report is to document the outcome of the Scoping Phase of the project. This draft report will be made available to I&APs for comment, prior to finalisation and submission to the authorities, to afford them the opportunity to ensure that their comments and input has been captured accurately and correctly understood.

1.4 ENVIRONMENTAL IMPACT ASSESSMENT TEAM

ILISO Consulting has been appointed as Independent Environmental Assessment Practitioner (EAP) to undertake the EIA. Dr Martin van Veelen is the Project Leader. This Draft Scoping Report was compiled by Terry Baker with input from a team of specialists. (**Table** 1.1)

Dr Martin van Veelen is a professional engineer with a PhD in aquatic health. He is the Managing Director of the ILISO Environmental Management Division and a certified Environmental Assessment Practitioner with 28 years experience. He specialises in project management, environmental impact assessments and water resource planning. He specifically has extensive experience in water quality, especially water quality management, water quality monitoring and water quality assessment. Martin has experience in managing projects that involve multi-disciplinary teams, and projects that involve public consultation and participation.

Terry Baker is a certified Environmental Assessment Practitioner (EAP), has a MA in Environmental Management and specialises in Environmental Impact Assessments and Project Management. She has been involved in a variety EIAs including for transmission lines, water supply projects, dams, roads and airports, in

South Africa, Botswana, Uganda, Lesotho, and Mozambique. She has been involved in public participation programmes, water quality assessments, socio-economic and institutional development projects and the use of Geographic Information Systems on a number of projects. Terry is actively involved in the International Association for Impact Assessment, and serves on the National Executive Committee of the South African Affiliate.

Table 1.1: EIA Project Team

PERSON	COMPANY	ROLE ON THE TEAM
MARTIN VAN VEELEN	ILISO CONSULTING	PROJECT LEADER
TERRY BAKER	ILISO CONSULTING	ENVIRONMENTAL ASSESSMENT PRACTITIONER
DEON ESTERHUIZEN	ILISO CONSULTING	ENVIRONMENTAL MANAGEMENT PLANS
KAREN JODAS	SAVANNAH ENVIRONMENTAL	BORROW AREA
SEAN O BEIRNE	SES	PEER REVIEW
BERT DE VRIES	ILISO CONSULTING	TRAFFIC
ANITA BRON	MASTERQ RESEARCH	SOCIAL
ANDREW DICKSON	MARGOT SANER AND ASSOCIATES	HEALTH
NANJA CHURR	KAYAMANDI	REGIONAL ECONOMICS AND LANDUSE
VERONICA RALL	GOLDER AFRICA	AQUATIC ECOLOGY
JOHNNY VAN SCHALKWYK	NATIONAL CULTURAL HISTORY MUSEUM	HERITAGE RESOURCES
DEREK COSIJN	JONGENS KEET ASSOCIATES	NOISE
RENE THOMAS	AIRSHED	AIR QUALITY
KAREN JAMES	INSITE	VISUAL IMPACTS

1.5 THE STRUCTURE OF THIS REPORT

The following information, in accordance with Regulation 29 of Government Notice 385, is included in this report:

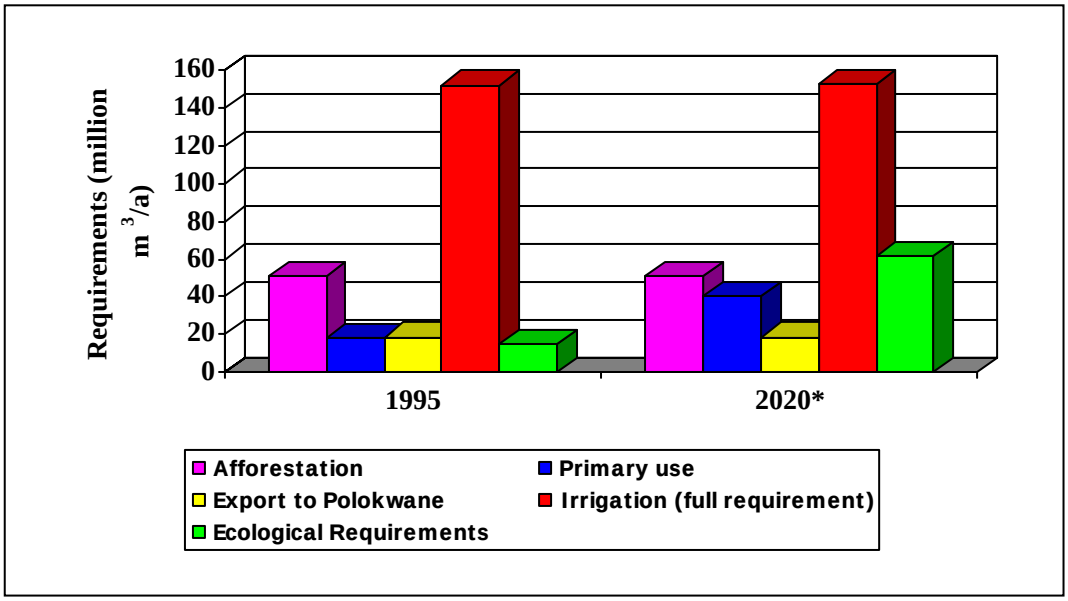
- background information, scope of the study and details and expertise of the EAP who compiled the scoping report (**Chapter 1**);
- the motivation for the proposed project (**Chapter 2**);
- a description of the proposed project **(Chapter 3**)
- an investigation of alternatives (**Chapter 4**);
- a description of the receiving environment (**Chapter 5**);
- legislation and guidelines that have been considered in the preparation of the scoping report (**Chapter 6**);
- public participation in the scoping phase.; (**Chapter 7**);
- key issues identified (**Chapter 8**);
- a plan of study for the Environmental Impact Assessment (**Chapter 9**);
- conclusions (**Chapter 10**); and
- references used in the study (**Chapter 11**).

2. MOTIVATION FOR THE PROJECT

The Groot Letaba Valley falls within the Luvuvhu-Letaba Water Management Area (WMA), one of the 19 WMAs into which South Africa is divided. Human settlement, agricultural production and tourism between the Drakensberg escarpment and the Kruger National Park have placed demands on the water resources of the Groot Letaba River which can no longer be met within reasonable risks of shortages from the existing infrastructure.

Faced with water shortages of increasing severity and frequency, the main consumptive users of water (irrigation, forestry, domestic and industrial) have from time to time had to compete for limited supplies by taking extraordinary measures to survive. This has resulted in serious degradation of the riverine ecosystems. Historically the environment was not considered a water user and was not allocated any water from available resources. However, in the Letaba River catchment 14.8 million m^3/annum was allocated, on an ad hoc basis, for release from Tzaneen Dam to the Kruger National Park but, as a result of evaporation and river abstractions, little if any of these releases reached the Park with real beneficial effect.

With the advent of the National Water Act (Act 36 of 1998 NWA), a water allocation or Reserve for basic human needs and for sustaining ecological functioning, has placed a new perspective on water resource management in the Groot Letaba River. The emphasis in the past has been on the augmentation of supplies to mitigate shortages in the Groot Letaba River. This approach must be complemented by a strategy for managing the water resources in a sustainable manner. Proposals for augmenting reliable water supplies from the Groot Letaba River include the construction of a dam on the Groot Letaba River at Nwamitwa just downstream of the Nwanedzi River as well as the possibility of the raising of Tzaneen Dam. Bulk infrastructure for the treatment, conveyance and storage of potable water for primary use forms an integral part of the development proposals. Attention is focused on water needs for the increasing human population, for downstream riverine ecosystems (including those in the Kruger National Park) as well as for stabilising commercial irrigation, including the settlement of resource-poor farmers (**Figure 2.1**).



Estimated in 1998 Feasibility Study

Figure 2.1: Water Utilization and Requirements

The catchment area of the proposed Nwamitwa Dam is 1 400 km^2 and the Mean Annual Runoff (MAR) is approximately 122,6 million m^3 under natural undeveloped conditions. For a dam with a storage capacity of 143,8 million m^3 the estimated increase in system yield is 47 million m^3/a after providing for the instream flow requirements as was estimated at the time.

The agricultural sector (fruit orchards dependant on irrigation) and the associated agro-industries provide the majority of employment opportunities in the area. Competition for the limited jobs is fierce and unemployment in the area is high and many people rely on income from family members working in the cities. Many communities do not have reasonable access to safe reliable water supplies and the ecosystems which rely on flow in the river system are subject to increasing stress and degradation. Further socio-economic development, in which tourism is expected to play an important role, is hampered by the limited availability of adequate water supplies.

The Groot Letaba River Water Development Project (GLWAP) is a major initiative by the Department of Water Affairs and Forestry in support of the Limpopo Provincial Government's development strategy for the province. The project will have a positive impact on the regional economics and on alleviating poverty. This will mainly be achieved through:

- Increasing the safe, reliable water supplies for domestic and industrial use;
- Minimizing the frequency, intensity and duration of restriction on the use of water allocated for irrigation of high value crops;
- An increase in total household income through stabilising the job market; and
- Providing leverage for the equitable distribution of resources.

The proposed infrastructure will make it possible to improve the management of water resources so as to stop degradation of the conservation status of the riverine ecosystem.

The GLEWAP includes a number of infrastructure components, as well as a range of other initiatives as described in **Chapter 3**.

3. DESCRIPTION OF THE PROJECT

The Groot Letaba River Water Resources Development Project is aimed at improving the management of the water resources in the catchment as a whole. It consists of non-infrastructure options to make more water available as well as the construction of infrastructure components. Although only the construction of the infrastructure components require authorisation from the DEAT and are subject to this EIA, they cannot be fully understood or evaluated in isolation from the non-infrastructure components.

The infrastructure components of the project include:

- Construction of Nwamitwa dam on the Groot Letaba River, downstream of the confluence of the Nwanedzi River. The dam wall could be up to 36 m high and have a gross storage capacity of up to 144 million m^3.
- The R529, D1292 and the P43/3 will have to be re-aligned to accommodate the dam.
- Raising of the Tzaneen dam could result in increasing the storage from 157.5 million m^3 up to approximately 203 million m^3.
- Construction of water treatment works, and construction of bulk water pipelines and pump stations from the dam for water supply for domestic to communities in the area. Pump stations and reservoirs could each occupy an area of about half a football field.
- Construction activities will take approximately 5 years with several construction teams working concurrently in different areas at the proposed dam site and along the pipeline routes.
- Residential accommodation for construction staff will be established in the vicinity of the proposed dam or in established towns. Housing, internal roads, water and electricity supply, water treatment, solid waste disposal, emergency facilities and recreational amenities will be provided.
- The construction cost of the infrastructure components of the project is estimated in excess of R1500 million.
- Construction sites will include offices, internal roads, water and electricity supply, waste water treatment, solid waste disposal, emergency facilities, areas for the handling of hazardous substances, workshops, washbays, areas for the safe storage or explosives and communication infrastructure.

Supply of water from new dam at the site known as Nwamitwa targeted by 2012 with full yield around 2013. Construction will start in 2009.

3.1 NON-INFRASTRUCTURE OPTIONS TO MAKE MORE WATER AVAILABLE

The DWAF is pursuing the following non-infrastructure options, which do not form part of the project for environmental authorisation, to make more water available:

- Water conservation and demand management, as well as water recycling and re-use. The aim is to ensure that increased efficiency and effectiveness of water use will help address some of the short- and long-term water requirements of the area.

- Local groundwater resources

  During the feasibility studies in the 1990s and from recent investigations, it was found that although groundwater cannot be considered as the only source of water to satisfy increasing needs, it can be used to good effect for small-scale domestic water supplies and food plot irrigation. In this area with limited water resources, the conjunctive use of ground and surface water should be promoted. Groundwater resources should be developed incrementally to increase yields, but with ongoing monitoring to ensure good water quality. The Department will make recommendations to local authorities in this regard.

- Removal of invasive alien vegetation

  DWAF's Working for Water Programme is actively removing invasive alien vegetation in the Groot Letaba Valley as a means of improving the yield in the river system.

3.2 INFRASTRUCTURE COMPONENTS OF THE PROJECT

As agreed with DEAT, this project is being implemented in an iterative manner. The details of the design of the infrastructure components (e.g. height of dam wall and pipeline routes) were not available for the Scoping Phase. These details will be finalised in time for the specialist studies and impact assessment phase. The Scoping Phase of the project was therefore based on a "highest impact scenario" by

considering, for example, the largest possible dam that would be considered, and an area within which the pipelines will be located.

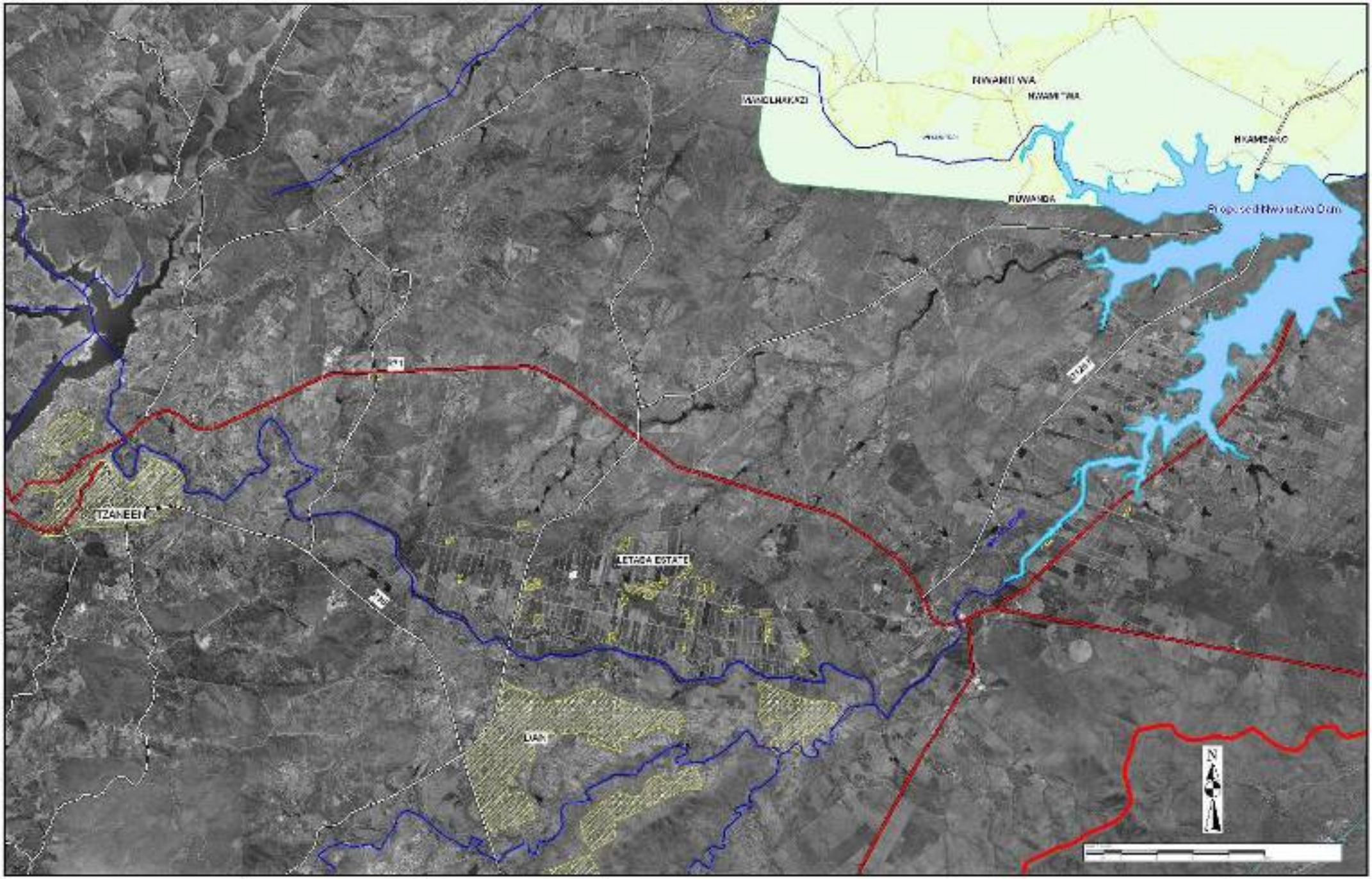
3.2.1 Dam at Nwamitwa Site

The main component of the proposed GLeWaP project comprises a new major storage dam at a site in the Groot Letaba, referred to as the Nwamitwa site, downstream of the confluence of the Nwanedzi River (**Figure 3.1**). The size of the dam has not been finalised yet. The maximum possible dam size (i.e. 36 m high) was used for Scoping purposes. The dam comprises of a concrete structure in the river section accommodating a spillway and outlet works, with earth embankments on both flanks. With a storage capacity of 144 million m^3 it would increase the system yield by about 47 million m^3 per year. (By comparison, the capacity of Tzaneen Dam is 157,5 million m^3).

The final size of the dam will be determined in a series of technical and financial investigations, informed by the findings of the EIA. The relative socio-economic impacts of different dam sizes, including number of households to be relocated and effects on the citrus industry are receiving particular attention. The possible dam sizes that are currently being investigated are indicated in (**Figure 3.2)**. The dam will be designed to enable the requirements of the Reserve in the Groot Letaba River, particularly in the river reach downstream of the dam, to be provided.

Local road alignments

The R529, D1292 and the P43/3 will have to be re-aligned to accommodate the dam. Proposed re-alignments are indicated on (**Figure 3.3**). Local alignments will be determined in consultation with landowners and the provincial road authorities and will take cognisance of the impacts investigated during the EIA



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CLIENT

ILISO CONSULTING

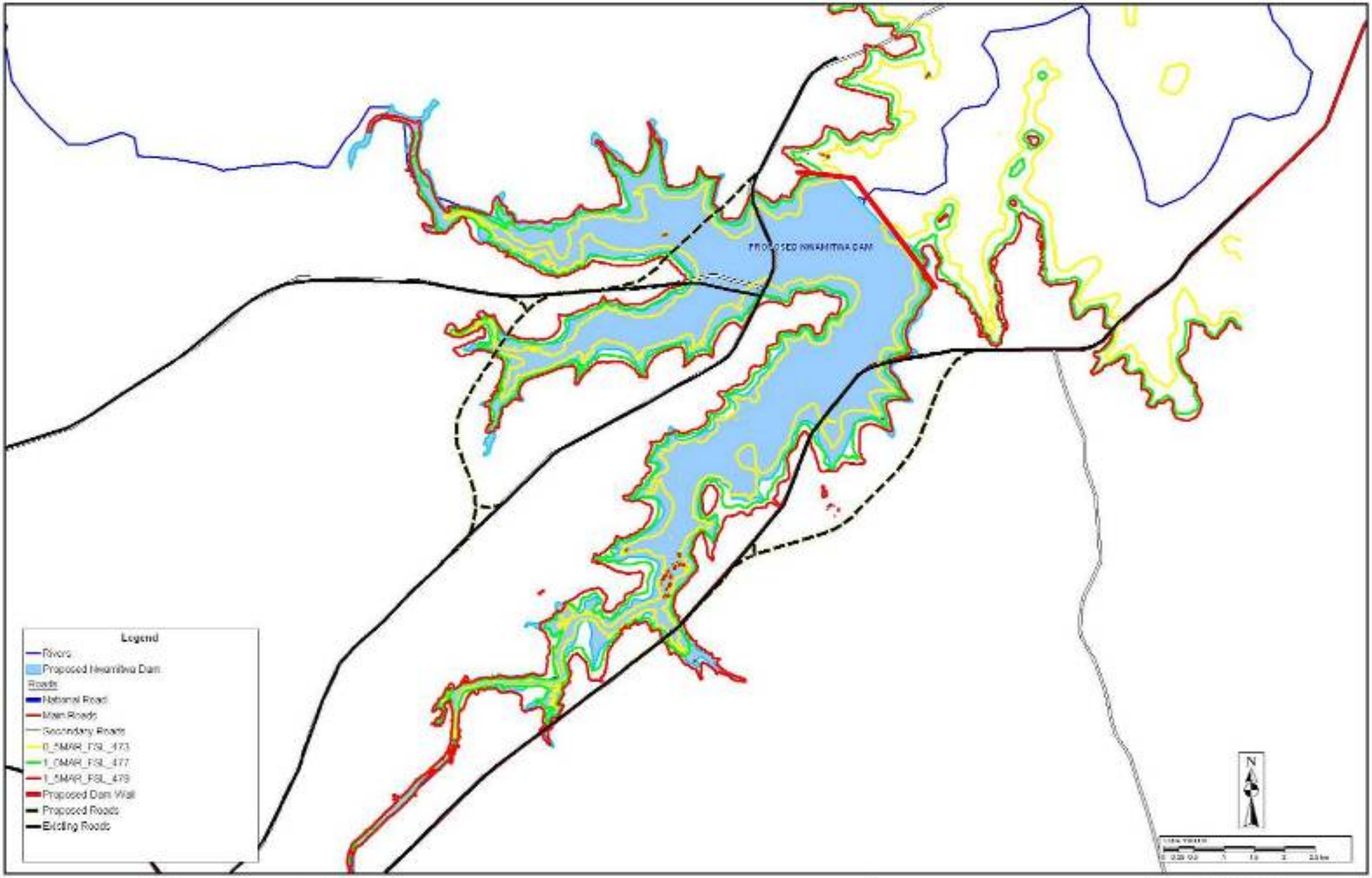
PROJECT

GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)

DRAWING TITLE

LOCALITY OF THE PROPOSED NWAMITWA DAM

FIGURE 3.1



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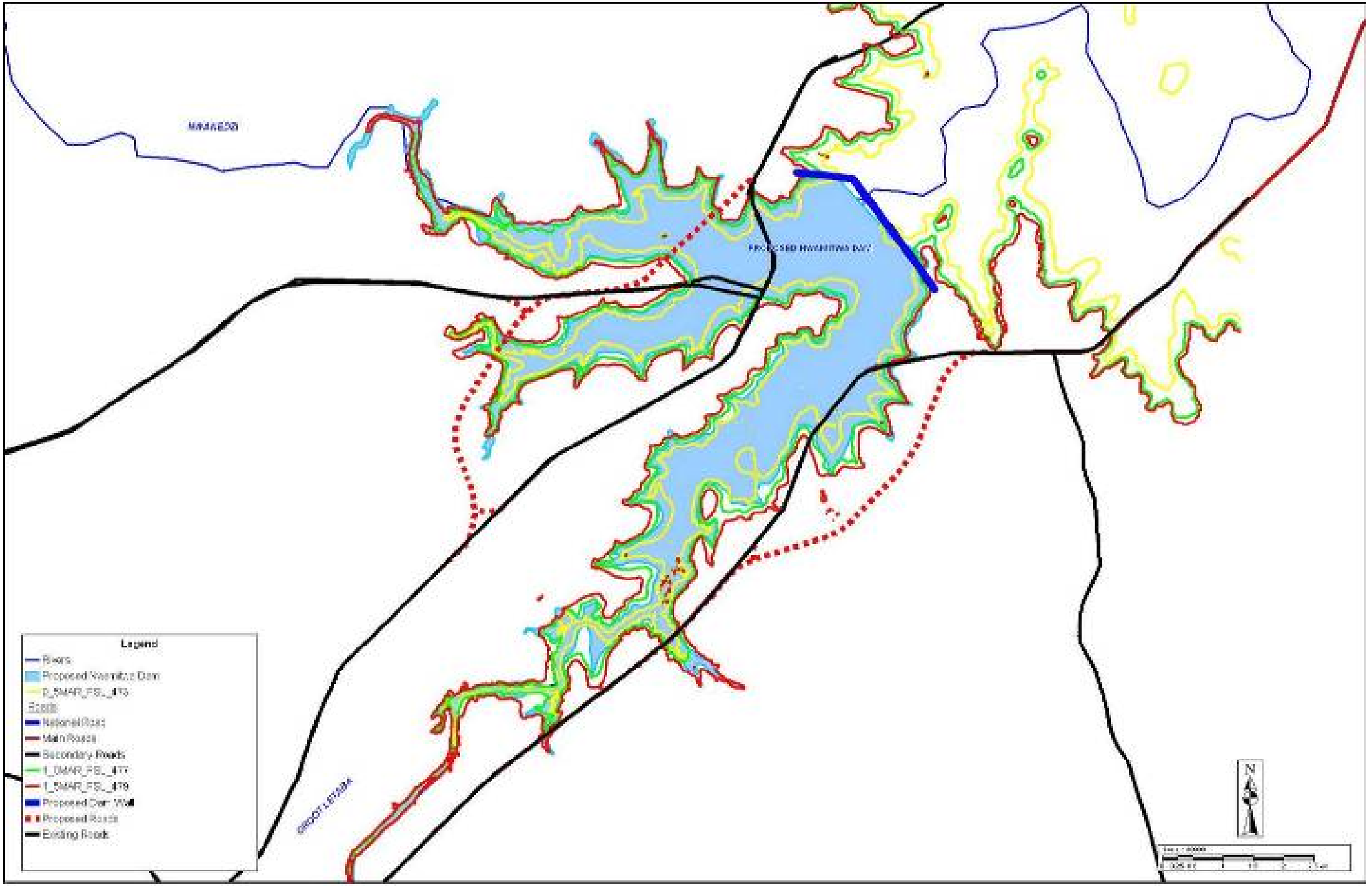
GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)

POSSIBLE DAM SIZES UNDER CONSTRUCTION

FIGURE 3.2



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GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)

PROPOSED RE-ALIGNMENT OF ROADS AFFECTED BY THE PROPOSED DAM AT THE SITE KNOW AS NWAMITWA

FIGURE 3.3

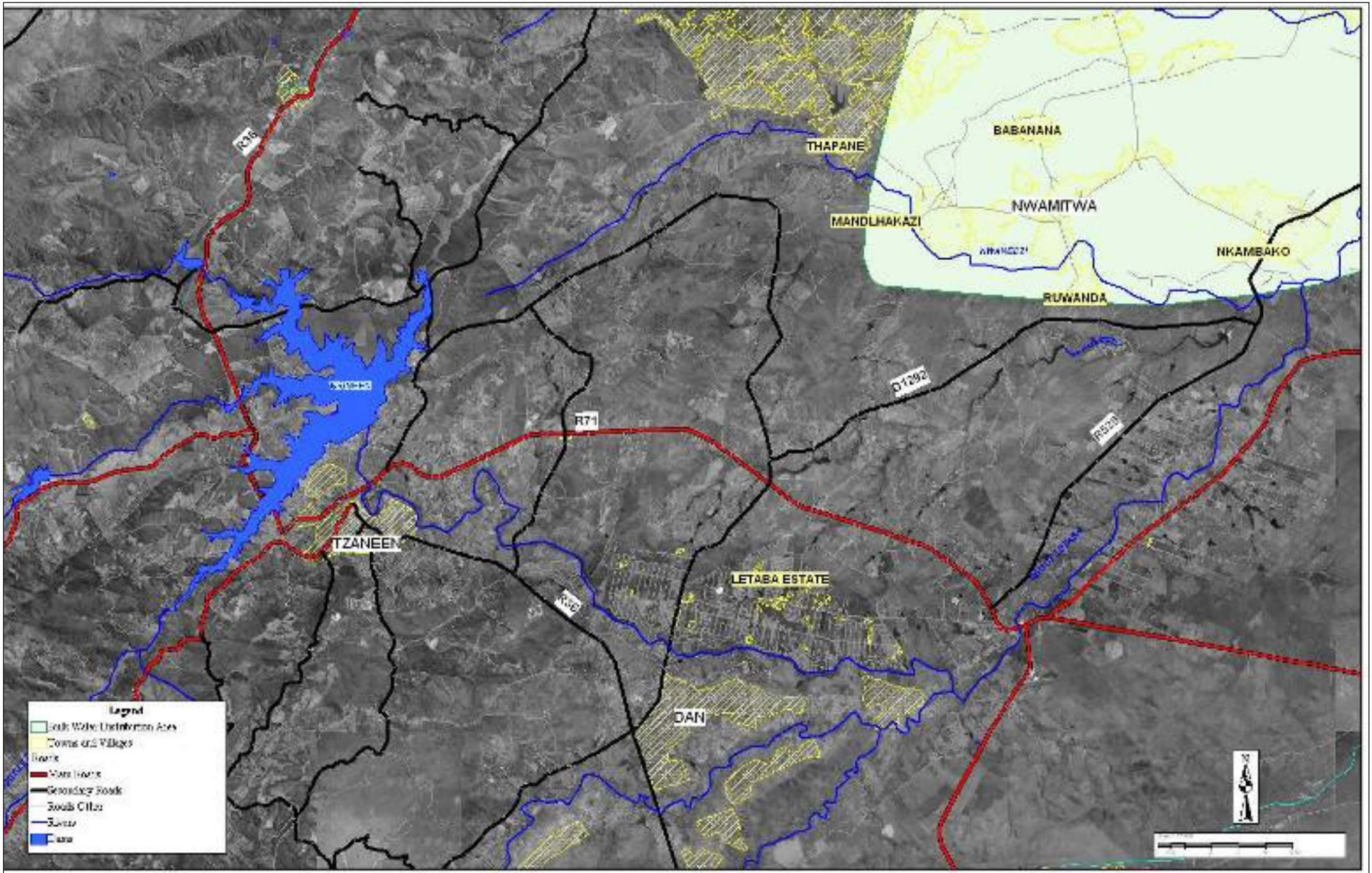
Raising of the Tzaneen Dam wall

It was also proposed to increase the capacity of Tzaneen Dam to approximately 203 million m³ by raising the dam wall. This could increase the firm yield of the dam by about 6% from 60 million m^3/a to 64 million m^3/a, but more importantly, the dam could then be operated so as to minimize the frequency and intensity of restrictions on water allocations for the irrigation of permanent fruit orchards.

The Tzaneen Dam, located on the Groot Letaba River close to the town of Tzaneen), mainly serves the irrigation demand along the Groot Letaba River valley, domestic and industrial water supply to Tzaneen, Nkowakowa, Letsitele, Consolidated Murchison Gold Mine, several other small industrial users, and a large number of rural villages.

3.2.2 Pipelines, Treatment works, Pump Stations and Reservoirs

Bulk water supply infrastructure including pipelines, a water treatment plant, various pump stations and reservoirs will be investigated. The area expected to be served is indicated in (**Figure 3.5**). Pipelines will be routed next to existing roads or pipelines as far as possible in order to minimise impacts. The exact routes of the pipelines will be used for the specialist studies and impact assessment phase of the project. The area expected to be served is generally fairly inform in terms of the natural and social environment, and this approach was therefore adequate for scoping purposes.



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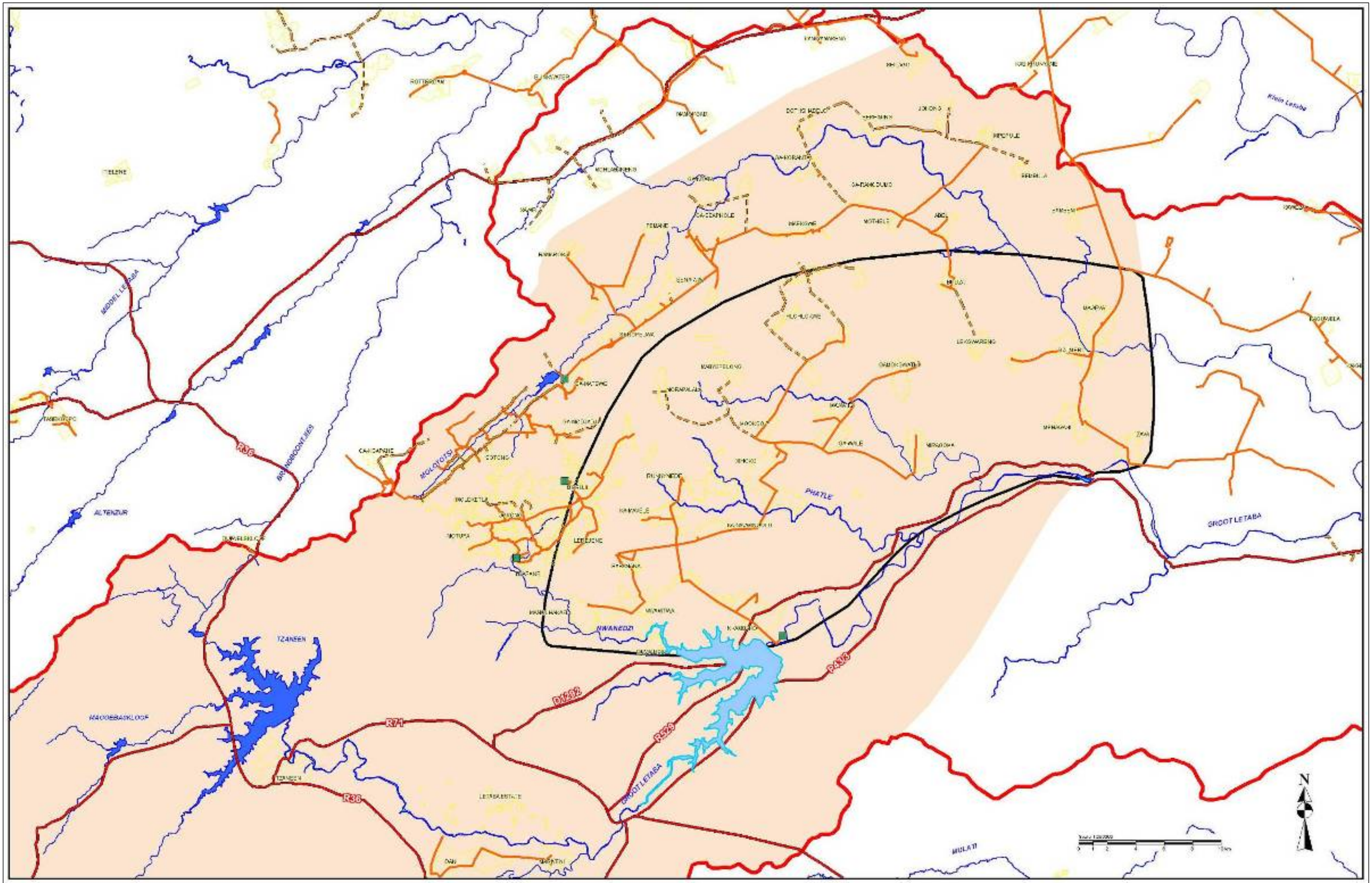
GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)

LOCALITY OF THE TZANEEN DAM

FIGURE 3.4



Legend

- Project Area
- Groot Letaba Catchment
- Bulk Water Distribution Area
- Towns
- Main Rivers
- Dams
- All Roads (project area roads)
- Proposed Nwanedzi Dam
- Existing Bulk Pipelines
- Proposed Bulk Pipelines
- Existing Treatment Works

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GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)

AREA TO BE SERVED BY BULK WATER SUPPLY INFRASTURCTURE

FIGURE 3.5

Date : September 2007
Map Ref. : P:\...\Letaba.mxp
System : WGS 84 Lat/Long

The various reservoirs will be located so that local authorities will be able to obtain water for reticulation to individual users. Existing bulk water supply infrastructure (**Figure 3.5**) will be incorporated into future development wherever it is feasible. The upgrading of one or more of the three existing water treatment works in the study area will be investigated as an alternative to constructing a new one.

Pump stations, reservoirs and treatment works will be fenced off with security fencing. Final sizing is still to be completed but pump stations and reservoirs could each occupy an area of approximately 0.5 ha (about half a football field).

Electricity requirements for the project will be assessed separately by Eskom, and will be subject to a separate EIA process, if required.

3.2.3 Construction

Construction activities will take approximately five (5) years, with several construction teams working concurrently in different areas at the proposed dam site and along the pipeline routes. Residential accommodation for construction staff will be established in the vicinity of the proposed dam or in established towns. Housing, internal roads, water and electricity supply, waste water treatment, solid waste disposal, emergency facilities and recreational amenities will be provided.
Construction sites will include offices, internal roads, water and electricity supply, waste water treatment, solid waste disposal, emergency facilities, areas for the handling of hazardous substances, workshops, washbays, areas for the safe storage of explosives, and communication infrastructure.

The sites will also include facilities for the bulk storage and dispensing of fuel for construction vehicles and working areas for stockpiling construction materials and concrete batching and bitumen plants.

3.2.4 Borrow pits

Location of the borrow areas for the sourcing of material for the dam and road construction works will be determined during the study and local landowners are

invited to contribute information about the occurrence of material suitable for this purpose.

3.2.5 Scheduling

DWAF's target is to commence with the supply of water from the new dam by 2012, with full yield by around 2013, should environmental authorisation be obtained. For this to be achieved construction of some of the infrastructure must start in late 2009. The possibility of starting to abstract water from the dam during the filling period is also being considered.

3.3 INSTITUTIONAL ARRANGEMENTS

It is foreseen that the Department of Water Affairs and Forestry will be the owner of the water resource components of the project. This will be revisited as and when new institutions such as the proposed National Water Resource Infrastructure Agency and the Catchment Management Agency (CMA) have been established. After completion, a regional water supply entity would be considered for the management of the new bulk distribution infrastructure. Any potable water supply systems that will be served by the bulk distribution system will thus be the responsibility of the relevant municipalities.

A high-level Project Steering Committee has been established by the DWAF, and includes the Limpopo Provincial Government, the Mopani District Municipality, local municipalities, traditional authorities, sectors such as conservation, agriculture and industry to steer the post feasibility bridging studies.

3.4 COOPERATIVE GOVERNANCE

Investigating and implementing such a major infrastructure project to improve water management in the area is likely to give rise to many development opportunities, lead to change in socio-economic circumstances, cause changes in land use and have other beneficial effects.

Numerous other government authorities thus need to be consulted and participate to accommodate these proposed developments in their planning and future activities.

This includes the local authorities who will be required to include these proposals in their Integrated Development Plans (IDPs) in order to ensure access to potable water for the communities they serve.

Together with the Department of Water Affairs and Forestry, they will assist in ensuring that, in the longer term, all the projects and developments resulting from this initiative are sustainable, and that as many people as possible benefit from infrastructure development now being investigated.

3.5 CAPACITY FOR COMMUNITY WATER SUPPLY

Although this project will not be directly responsible for community water supply, it will make more water available for this purpose to local water service providers, such as municipalities. Provision will be made for off-takes from the bulk water distribution system or alternatively water will be delivered into reservoirs at agreed locations.

3.6 FUNDING OF THE GLEWAP

The construction cost of the infrastructure components of the project is estimated to be in excess of R1 500 million. Funding sources are likely to include a private sector component and a public sector component funded by Treasury.

4. ALTERNATIVES

4.1 DO NOTHING

The NWA requires that the Reserve (basic human needs and ecological) receive the first right to available water. International obligations and strategic requirements must then be honoured. Water available after that can be allocated for beneficial use. The implication is that if no measures are taken to increase the ability to manage the water resources in the catchment, there will be shortages for irrigation and other developments and the socio-economic development in the region will be limited.

Plate 4-1 and **Plate 4-2** show some of the measures that communities living in the study area are already taking to acquire water for domestic purposes.

Plate 4-1: Women and children collecting water from the Groot Letaba River

Plate 4-2: Water vendor collecting water from the Groot Letaba River

People in some villages in the study area are dissatisfied with the quality of the groundwater that is available. The groundwater has a high salinity which is unpleasant to drink and use in cooking. The foaming of washing powder may also be affected. These people are therefore resorting to collecting their own water from local rivers. Water collected is not treated, introducing potential health risks. Collecting

water can also use up significant amounts of women and children's time, preventing them from attending to other activities like education, income generation and household chores.

Uncontrolled water collection from rivers also impacts on the natural environment. The riparian vegetation, geomorphology of the river and fauna in the river can be impacted on by water collecting activities. If communities feel an increased need for water, they may even start to build informal unauthorized structures to assist them to collect water. Such structures could have increased impacts on the natural functioning of the river.

The "no project" option, although the easy way out for the DWAF, is therefore not considered the best alternative as it does not allow for the desired ability to manage and operate the water resource system, and is likely to result in increased negative social, economic and ecological states in the Province.

4.2 REPLACING COMMERCIAL AFFORESTATION WITH NATURAL VEGETATION

The 1998 Feasibility Study investigated replacing commercial forestry areas with natural vegetation in order to reduce this streamflow reduction activity with the intention of resulting in increased flows in the Groot Letaba River.

These investigations found that the positive impact on flows in the river as a result of this afforestation would be fairly limited due to the type of natural vegetation in the areas of concern also being relatively significant water users. The undesirable impact on the regional economy and local employment that deforestation would likely to result in also negate this option. The forestry areas are also in the upper regions of the catchment which is already highly controlled by existing dams. Replacing commercial afforestation with natural vegetation is therefore not considered a viable solution for to the need to improve the ability to manage the water resources in this area.

4.3 CEASING EXPORT OF WATER TO THE SAND RIVER CATCHMENT

An annual allocation of 18, 5 million m^3 per annum is exported to Polokwane. This volume is extracted from the Dap Naude Dam and Ebenezer Dam in accordance with long standing allocations and permits. Polokwane does not have reasonable alternatives for importing water and therefore this option would impact significantly on water supply to the Polokwane area. The quantity of concern is also not sufficient to fulfil the requirements identified for this project.

4.4 IMPROVE UTILIZATION EFFICIENCY OF IRRIGATION WATER

Irrigators in the Groot Letaba River system, and particularly those reliant on Tzaneen Dam, are regularly subject to restrictions on the water available.

Allocations are currently curtailed and irrigators receive 50% of the annual quota as a result of the current drought conditions and low levels of water in storage. This has had a significant impact on fruit production and on the socio-economy of the region. The irrigation sector already relies on modern technology and has invested heavily in management and sophisticated equipment to improve water use efficiency. Inefficient flood irrigation methods are rarely encountered in the study area. There is therefore little scope for improvement in this sector.

4.5 DECREASE IRRIGATION ALLOCATIONS

The agricultural sector (fruit orchards dependant on irrigation) and the associated agro-industries provide the majority of employment opportunities in the area (**Table 4.1**).

Table 4.1: Labour Force per sector, 2001

Industry	Greater Giyani	Greater Letaba	Greater Tzaneen	Ba-Phalaborwa	Maruleng	Mopani District
Agriculture	1797	10798	19321	3286	6077	41279
Mining	233	55	804	5977	131	7200
Manufacturing	640	1371	7741	2653	465	12870

Industry	Greater Giyani	Greater Letaba	Greater Tzaneen	Ba-Phalaborwa	Maruleng	Mopani District
Electricity and water	357	299	471	264	78	1469
Construction	1350	1315	2771	1673	572	7681
Wholesale and retail trade	2950	4632	8547	3433	1194	20756
Transport and communication	620	742	1669	765	1117	4913
Financial and business services	1208	819	3018	1695	435	7175
Community, social and personal services	8042	4583	10686	5702	2579	31592
Private Households	1905	1522	5174	2592	1153	12346
Undetermined	1799	1336	5069	2666	1087	11957
Not applicable	108324	93255	157167	52385	38431	449562
TOTAL	129225	120727	222438	83091	53319	608800

Source: Census 2001

Competition for the limited jobs is fierce and unemployment in the area is high (**Table 4.2**) and many people rely on income from family members working in the cities.

Table 4.2: Percentage distribution of employment status, 1996 and 2001

Local Area	Employed		Unemployed		Not Working/Other	
Year	1996	2001	1996	2001	1996	2001
Greater Giyani	9.2%	16.2%	9.5%	24.7%	81.4%	59.1%
Greater Letaba	9.0%	22.7%	8.9%	16.6%	82.1%	60.7%
Greater Tzaneen	16.3%	29.4%	9.5%	21.7%	74.3%	49.0%
Ba-Phalaborwa	24.5%	36.9%	10.1%	25.0%	65.4%	38.1%
Maruleng	12.8%	27.9%	9.4%	18.7%	77.8%	53.4%
MOPANI DISTRICT	14%	26%	9%	21%	77%	52%

Source: Census 1996, 2001

Decreasing allocations to the irrigation sector is therefore not recommended.

4.6 WATER LOSS MANAGEMENT: DOMESTIC AND INDUSTRIAL

Effective management systems to counter water loss can most certainly contribute to the increased availability of water. Maintenance tasks such repairs of pipelines must be carried out as part of a comprehensive management system. Estimates, however, indicate that even with optimistic projections, these actions alone will not provide sufficient water to meet the requirements.

4.7 CREATE ADDITIONAL STORAGE

The objective of creating additional storage (in the form of a dam) is for more effective water management in the catchment. The pre-feasibility investigations found that further resource development in the river system was still an option. The following alternative sites for additional storage were investigated (**Figure 4.1**):

- The raising of the Tzaneen Dam Wall;
- Constructing a storage dams at other sites, like Hobson's Choice in the Letsitele River; and
- the Nwamitwa Dam.

4.7.1 Raising of the Tzaneen Dam Wall

It was proposed to increase the capacity of Tzaneen Dam to approximately 203 million m³ by raising the wall. This could increase the firm yield of the dam by about 6% from 60 million m^3/a to 64 million m^3/a, but more importantly, the dam could then be operated to minimize the frequency and intensity of restrictions on water allocations for the irrigation of permanent fruit orchards. This is a cost-effective alternative that is being investigated further in the post feasibility bridging studies.

4.7.2 Constructing a storage dam at Hobson's' Choice in the Letsitele River

The construction of a storage dam at Hobson's' Choice in the Letsitele River was investigated but was also not found to be economically viable. This option will therefore not be investigated any further.

4.7.3 Constructing a storage dam at Nwamitwa

The construction of a storage dam at Nwamitwa was investigated but was found to be reasonable (but not good). This would need to be considered together with improved water management interventions.

4.8 IMPROVE WATER MANAGEMENT IN ALL USER SECTORS

Although water made available as a result of conservation and demand management strategies and recycling cannot on their own meet the projected requirements, they should and will be implemented in conjunction with the infrastructure development project.

5. DESCRIPTION OF THE RECEIVING ENVIRONMENT

5.1 CLIMATE

The Groot Letaba River is an international river with headwaters in the high rainfall Izintaba Zokhahlamba (Drakensberg) mountain range. The river then flows through drier arid regions into the Kruger National Park (KNP) and then on to Mozambique.

5.1.1 Temperature

Temperature ranges from the Tzaneen Station are indicated in **Table 5.1**.

Table 5.1: Temperature of the Groot Letaba catchment area

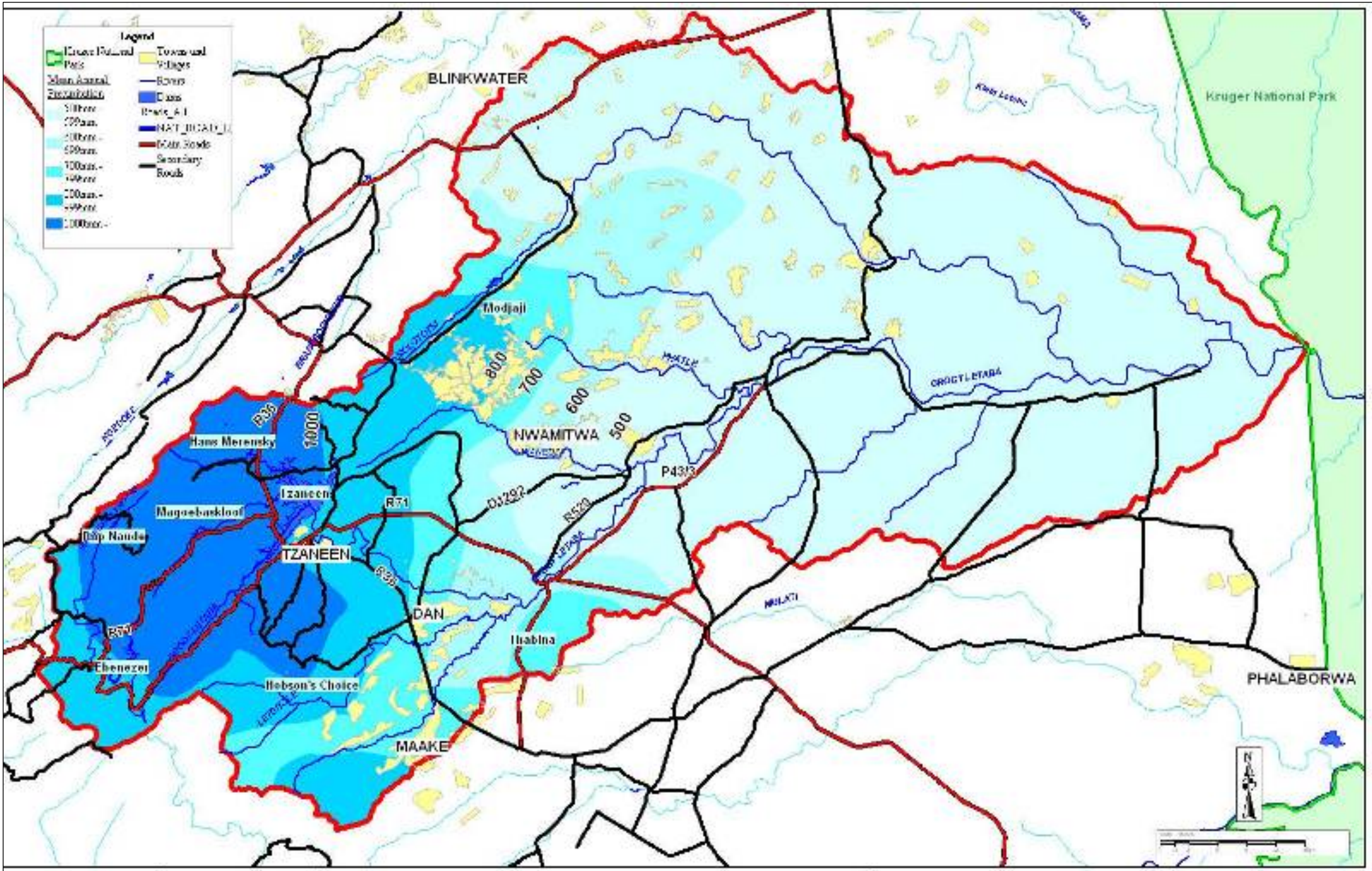
	Minimum (^{0}C)	Maximum (^{0}C)	Average (^{0}C)
Summer	20.3	27.9	26.3
Winter	15.3	20.8	17.6

5.1.2 Rainfall

The mountainous topography results in a much higher rainfall with the Mean Average Precipitation (MAP) varying between 700 mm – 1500 mm in the mountainous region. The MAP for the remainder of the catchment varies from 450 mm – 800 mm. The data is evidence that most of the rainfall occurs in the western mountainous region of the study area **(Figure 5.1**Error! Reference source not found.).

Most of the rainfall is seasonal with more than 85 % occurring during the summer months. The peak rainfall months are January and February.

The rate of evaporation increases from 1500 mm/a in the eastern plains to 1900 mm/a in the mountainous west. Approximately 60 % of the evaporation occurs during the summer months from October to March.



water & forestry		GROOT LETABE RIVER WATER DEVELOPMENT PROJECT (GLeWaP)	RAINFALL DISTRIBUTION	FIGURE 5.1
				COPYRIGHT RESERVED

5.2 GEOLOGY, SOILS AND TOPOGRAPHY

The Greater Tzaneen Local Municipality area is characterised by mountainous, inaccessible terrain in the west and south, and even topography (gentle slopes) to the north and east. The Greater Letaba, Greater Giyani and Ba-Phalaborwa municipal areas are flatter than the rest of the study area.

The geology of the proposed Nwamitwa dam site consists of Goudplaas Gneiss from the Swazian age. Underlying this is granite gneiss and diabase dykes. The Granite rocks surround various formations of the Petersburg group. The most widespread type is Leucocratic biotite genies, probably tonalitic in composition and shows clear intrusive relationships. The area is also characterised by numerous diabase dykes parallel to the Tzaneen lineament.

In the Southwest of the study area these granites are expected to be deeply weathered (up to 20 m) resulting in silty soils. The rest of the Groot Letaba catchment is made up of granites that allow shallow weathering (less than 10 m) and the soils formed are expected to be more sandy.

The Groot Letaba Catchment area can be divided into three zones.

- The Mountainous zone, which forms the headwater and originated at about 1600 masl in the Broederstroom Woodbrush forestry area. The two headwaters are the Broederstroom and Helpmekaar streams. These two streams join in the Ebenezer Dam to form the Groot Letaba River. From here the river drops steeply through the mountainous zone to the Tzaneen Dam.

- From the Tzaneen Dam the Groot Letaba River flows through the Low mountainous foothills zone to the confluence of the Letsitele River.

- From the confluence of the Letsitele River, the Groot Letaba River meanders across the plains for a distance of 400 km before flowing into the Olifants River 7 km upstream of the Mozambique border. The proposed Nwamitwa Dam will inundate an area of the Nwanedzi River (upstream from the GLR/Nwanedzi

confluence) from where it meanders through the plains zone. The Plains zone extends eastwards and northwards to the Lebombo and Soutpansberg mountains. Slopes rarely exceed a 5% gradient and the altitude ranges from 200 m in the east to 600 m in the west.

The soils in the drier part of the proposed Nwanedzi Dam site are generally alkaline, shallow silty to sandy. The residual soils, where present, are usually between 1,5 to 2 m thick, coarsely textured, non-cohesive and consist mostly of quartz and feldspar aggregates.

The soil forms mainly present are the Hutton and Shortlands. Hutton soils have Orthic A horizon overlaying a red apedal B and have series Faringham, Balmoraa, Msinga, Doveton and Vimy. The Shortlands soil form has an Orthic A horizon over a red structured B horizon and has series Argent, Richmond and Shortlands present in the area. Possible problems can be that the sandy soils present upstream from the GLR in the Nwanedzi River as these are very permeable, resulting in a high infiltration and thus reducing run off. The silty soils will be able to absorb large quantities of water but once saturated runoff will increase. It should be noted that where vegetation cover is destroyed, the soils are susceptible to extreme erosion which in turn will cause an increase in sedimentation in the river channels which might require rehabilitation measures.

5.3 SURFACE WATER

The Groot Letaba River rises in the western part of the catchment and flows in an easterly direction. The most important tributaries of the Groot Letaba River are the Letsitele River and the Nwanedzi River.

The Letaba River Catchment has a surface area of approximately 13 500 km^2. The relevant sub-catchments relevant to this study are:

- Groot Letaba River (upper 650 km^2 and lower 2 260 km^2);
- Letsitele River (480 km^2); and
- Nwanedzi River (410 km^2).

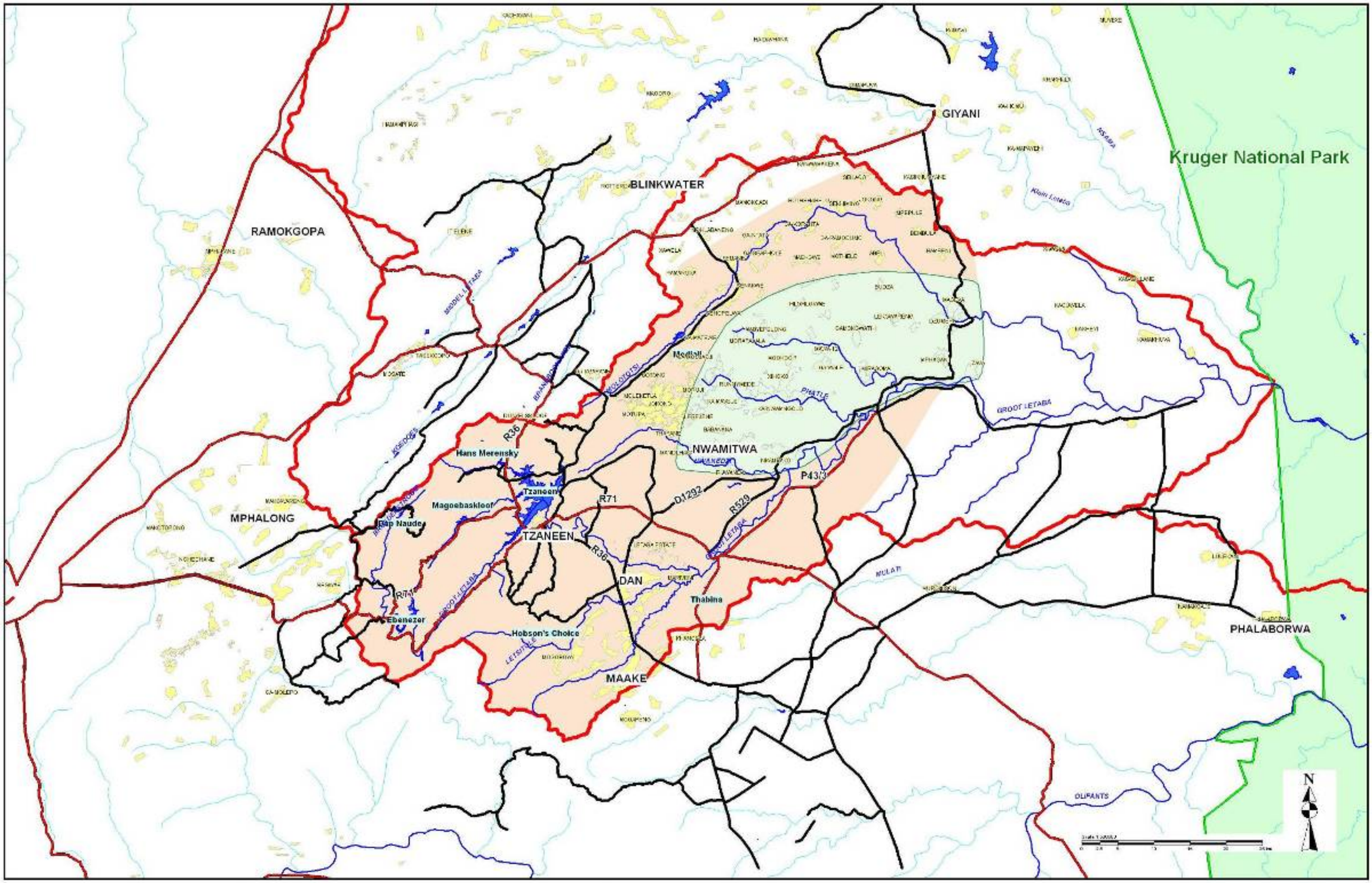
The proposed dam site falls within the Groot Letaba River (lower) sub-catchment which is a relatively large sub-catchment measuring about 2 260 km^2 in extent

According to the Internal Strategic Perspective (ISP) (DWAF: 2004) the surface water resources within this sub-catchment are extensively developed with a large number of small to major dams constructed to meet domestic (urban and rural), irrigation and industrial water needs. This is seen in **(Figure 5.2) .** The water supply schemes generally consist of dams for storage, bulk water pipelines and canals for conveyance.

The gross surface water availability in the Groot Letaba sub-area is estimated at 168 million m^3 per annum which is derived from the yield of the Tzaneen and Ebenezer dams as well as significant run-of-river abstractions. The Tzaneen Dam, if operated in isolation, provides a yield of approximately 60 million m^3 annum. However, when operated in a systems context to supply water to irrigators downstream only when the run-of-river flows are inadequate, the total yield is much greater.

Invasive Alien Plants reduce the yield by a further 10 million m^3 per annum, resulting in the available surface water resource being 133 million m^3 per annum (at a 1:50 year assurance). The historical yield of the Ebenezer Dam is quoted in the Groot Letaba Feasibility Study report as 23, 9 million m^3 per annum, which is much less than the 31, 7 million m^3 per annum given in White Paper WP I '84. Allocations have been based on the yield of 31, 7 million m^3 per annum and the dam is therefore now over-allocated.

Return flows are available for re-use and, in general, contribute to the available resource. In the Groot Letaba catchment there are undoubtedly substantial return flows from irrigation in the catchment. These are estimated to contribute 13 million m^3 per annum to the available water resources in the Groot Letaba. This estimate is based on a 10% return flow, which is typical of return flows from irrigation. However, it should be noted that irrigation practices in the Groot Letaba are known to be very efficient and that the return flow estimate used in the NWRS could be too high.



Legend

- Kruger National Park
- Groot Letaba Catchment
- Project Area
- Towns and Villages
- Bulk Water Distribution Area
- WMA_Letaba
- Rivers
- Dams
- Roads_A1
- NAT_ROAD_LINKS
- Main Roads
- Secondary Roads

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GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)

DAMS IN THE GROOT LETABA CATCHMENT

FIGURE 5.2

Date : September 2007
Map Ref : P.V. Aurecon map
System : WGS 84 Lat/Long

5.4 WATER QUALITY

The water quality in the Groot Letaba River is of a good quality with respect to irrigation, domestic use and the aquatic ecology, especially in the upper reaches. The quality of the water deteriorates somewhat in the lower reaches due to salination from natural sources, as well as nutrient enrichment due to human activities such as the discharge of treated domestic wastewater and run-off from agricultural areas.

5.5 BIODIVERSITY

Although the proposed project will only impact on the terrestrial ecology in the direct local vicinity of the dam, road re-alignment and bulk water supply infrastructure, this section describes the entire study area as indicated on **Figure 1.1**. The extensive lists of species used for the scoping process are included in **Appendix A** which is not attached to the draft report for public comment.

5.5.1 Centres of Endemism

The project area is not situated in any Centres of Plant Endemism[1] (sensu Van Wyk & Smith, 2001).

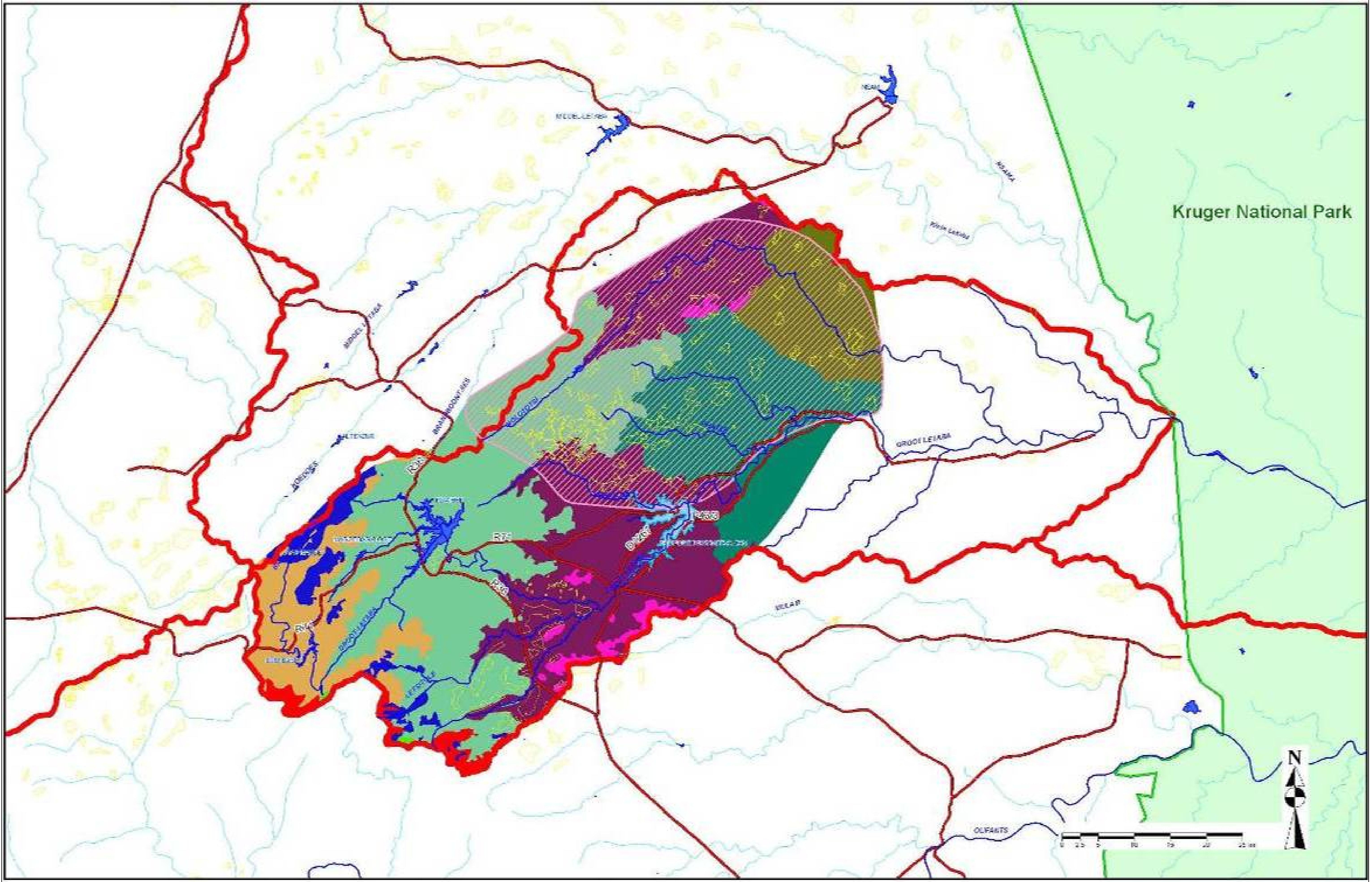
5.5.2 Vegetation Types

According to the new vegetation map of South Africa, Lesotho and Swaziland (Mucina & Rutherford, 2006), the project area covers ten different vegetation types (**Table 5.2** and **Figure 5.3**).

[1] A centre of plant endemism is an area that is distinguished by high concentrations of endemic plant species

Table 5.2: Status and extent of vegetation types represented in the project area

Vegetation Type	Ecosystem Status	Area (ha)	% of total
Granite Lowveld	Vulnerable	24 104	6.92
Gravelotte Rocky Bushveld	Least Threatened	4 480	1.29
Lowveld Rugged Mopaneveld	Least Threatened	17 737	5.09
Northern Escarpment Quartzite Sourveld	Vulnerable	4 424	1.27
Northern Mistbelt Forest	Least Threatened	9 988	2.87
Origstad Mountain Bushveld	Least Threatened	403	0.12
Subtropical Freshwater Wetlands	Least Threatened	63	0.02
Tsende Mopaneveld	Least Threatened	23 903	6.86
Tzaneen Sour Bushveld	Endangered	53 368	15.31
Woodbush Granite Grassland	Critically Endangered	6 097	1.75
Transformed and Degraded	Not Threatened	203 955	58.50
Total		348 522	100.00



water & forestry Department: Water Affairs and Forestry REPUBLIC OF SOUTH AFRICA	CLIENT ILISO CONSULTING	PROJECT **GREATER LETABA STUDY AREA**	DRAWING TITLE **VEGETATION MAP**	**FIGURE 5.3** COPYRIGHT RESERVED

A list of conservation-important plant species is derived from the South African Biodiversity Institute's (2007) interim Red Data list and from the PRECIS database for the quarter-degree squares 2329DD, 2330AD, BC, CA, CB, CC, CD, DA, DC, 2430AA is included in **Appendix A-1**. Species were screened to only include those likely to be associated with the vegetation type and habitats represented in the project area. Protected[2] species, Endemic species, and Red Data species were highlighted in the lists, using the above references.

5.5.3 Fauna

The lists of conservation-important animals potentially occurring in the study area comprises mammals (**Appendix A-2**), birds (**Appendix A-3**), reptiles and amphibians (**Appendix A-4**) and Invertebrates (**Appendix A-5**).

5.5.4 Conservation Importance

Based on assessment criteria developed for the baseline study (**Table 5.3** and **Table** 5.4), each conservation-important plant and animal species listed in the Appendices was assigned a conservation importance status (e.g. High, Medium, Low) per vegetation type the species would potentially occur in. Vegetation types were then ranked according to inherent species importance distributions[3]; the highest rank going to the vegetation type with the greatest number of species of Very High importance, and so on (**Table 5.11 – Table 5.15**).

Rankings were then subjectively clustered into High, Medium and Low categories[4] on the basis of the numbers and importance levels of species represented within each of their respective vegetation types. Thus each vegetation type was assigned a conservation importance rating for each biotic element represented.

x

[2] Either in terms of the Limpopo Environmental Management Act (No. 7 of 2003) or the National Forests Act (Act 84 of 1998).
[3] The invertebrate specialist applied a scoring system whereby importance levels were multiplied by probability of occurrence (High importance and High probability scoring high and vice versa).
[4] It must be emphasised that these categories are only applicable at project scale

Table 5.3: Framework of criteria for assessing Conservation Importance[5] of Flora

IUCN Red Data Status	Flora			
	Distribution in SA confined to Limpopo Province		Widely distributed in SA	
	Non-protected	Protected	Non-protected	Protected
CR, EN	Very High	Very High	Very High	Very High
VU, NT	High	Very High	Medium	High
LC, DD, STBA	Medium	High	Low	Medium
None	Low	Medium	Very Low	Low

CR = Critically Endangered

EN = Endangered

VU = Vulnerable

NT = Near-Threatened

LC = Least Concern

DD = Data Deficient

STBA = Status to be announced

Table 5.4: Framework of criteria for assessing Conservation Importance of Fauna

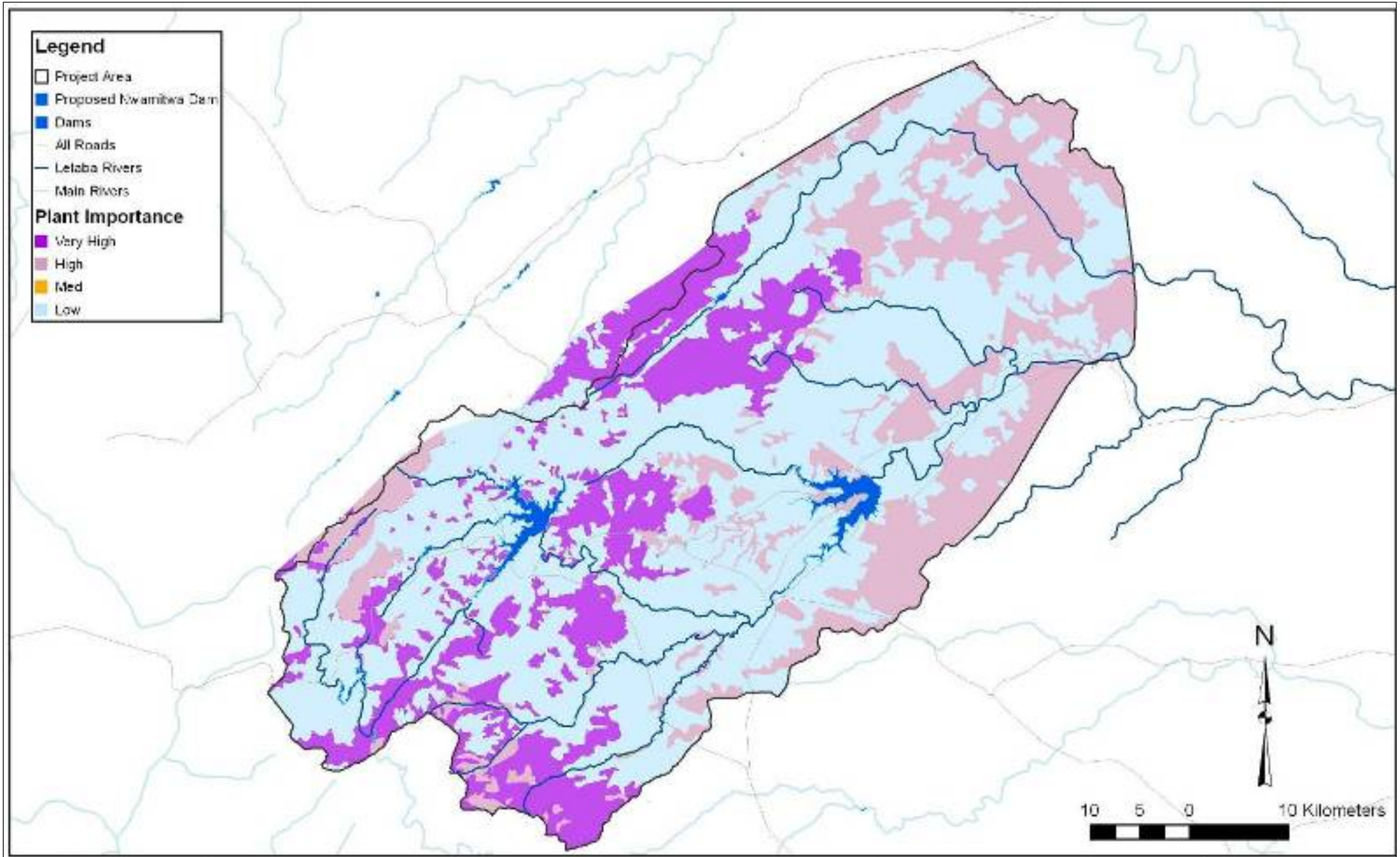
Red Data Status	Breeding / Foraging							
	Local Endemic		Regional Endemic		National Endemic		Global	
	NonProt	Prot	NonProt	Prot	NonProt	Prot	NonProt	Prot
CR, EN	Very High	Very High	Very High	Very High	Very High	Very High	Very High	Very High
VU, NT	High	Very High	High	Very High	High	High	High	High
DD	Medium	High	Medium	High	Medium	Medium	Medium	Medium

[5] The conservation-importance ratings of plant species listed by SANBI (2007) as 'rare' were elevated by one level

LC, None	Medium	High	Low	Medium	Low	Medium	Low	Medium

Red Data Status	Foraging Only							
	Local Endemic		Regional Endemic		National Endemic		Global	
	NonProt	Prot	NonProt	Prot	NonProt	Prot	NonProt	Prot
CR, EN	High	High	High	High	High	High	High	High
VU, NT	Medium	High	Medium	High	Medium	Medium	Medium	Medium
DD	Low	Medium	Low	Medium	Low	Low	Low	Low
LC, None	Low	Medium	Very Low	Low	Very Low	Low	None	Low

The conservation importance levels assigned to each vegetation type were then applied to the vegetation types on the vegetation map (**Figure 5.3**) to provide a first-approximation spatial 'sensitivity' profile for each of the biota represented in the project area **(Figure 5.4**Error! Reference source not found. **to Figure 5.8**).



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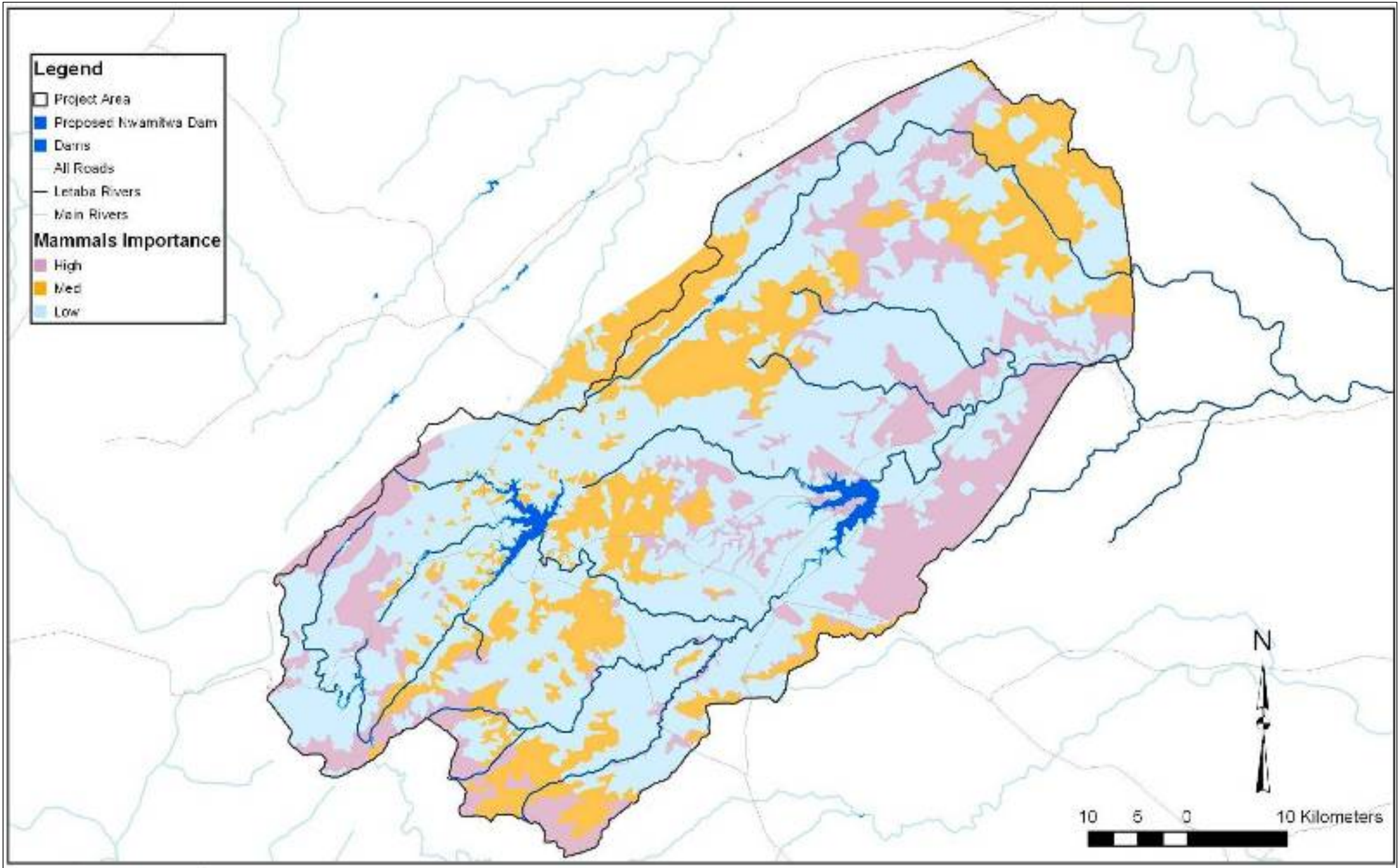
GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)

CONSERVATION IMPORTANCE OF PLANTS

FIGURE 5.4

Date: September 2007
Map Ref: P:\Letaba_Plants.mxd
System: ArcGIS



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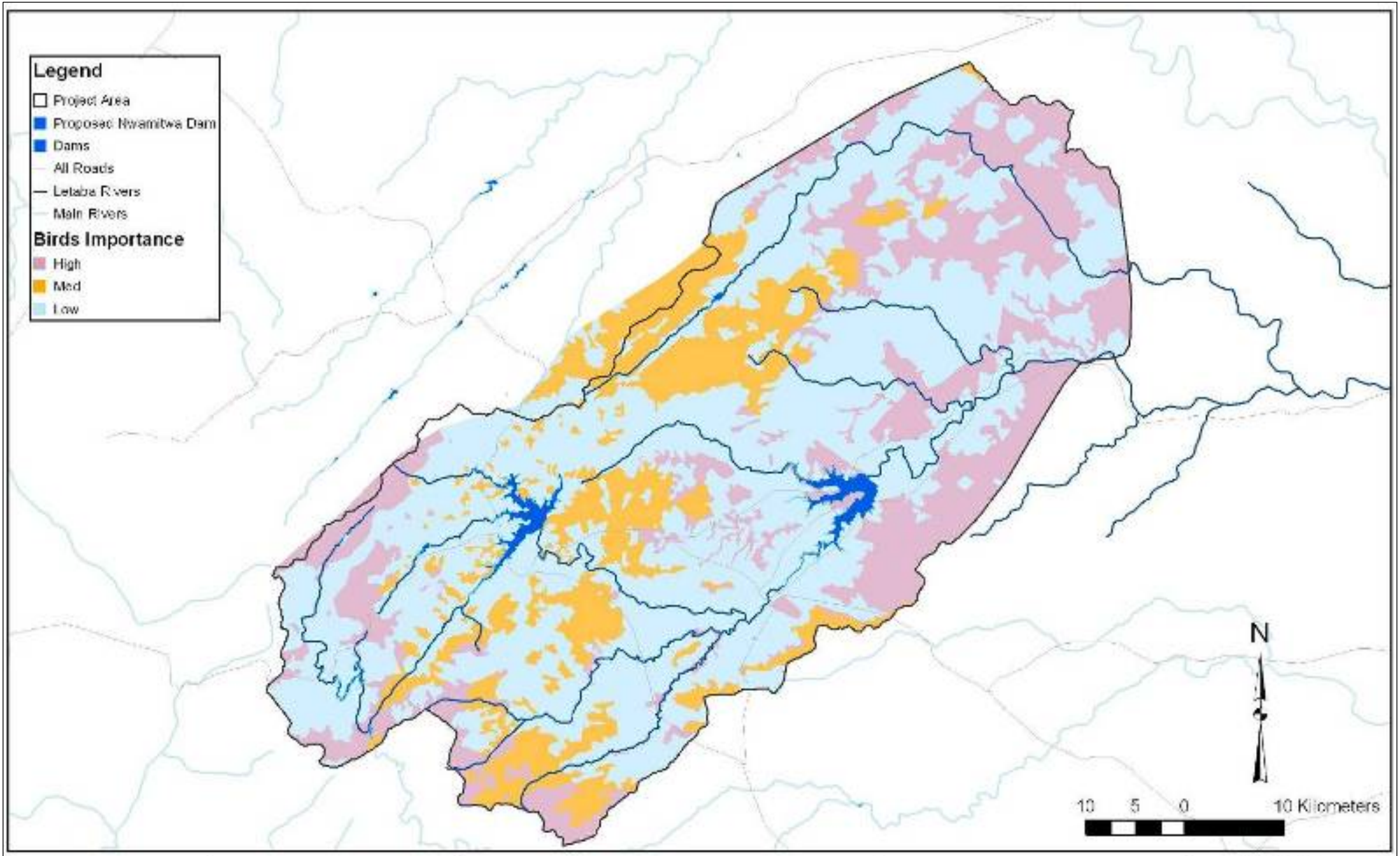
GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)

CONSERVATION IMPORTANCE OF MAMMALS

FIGURE 5.5



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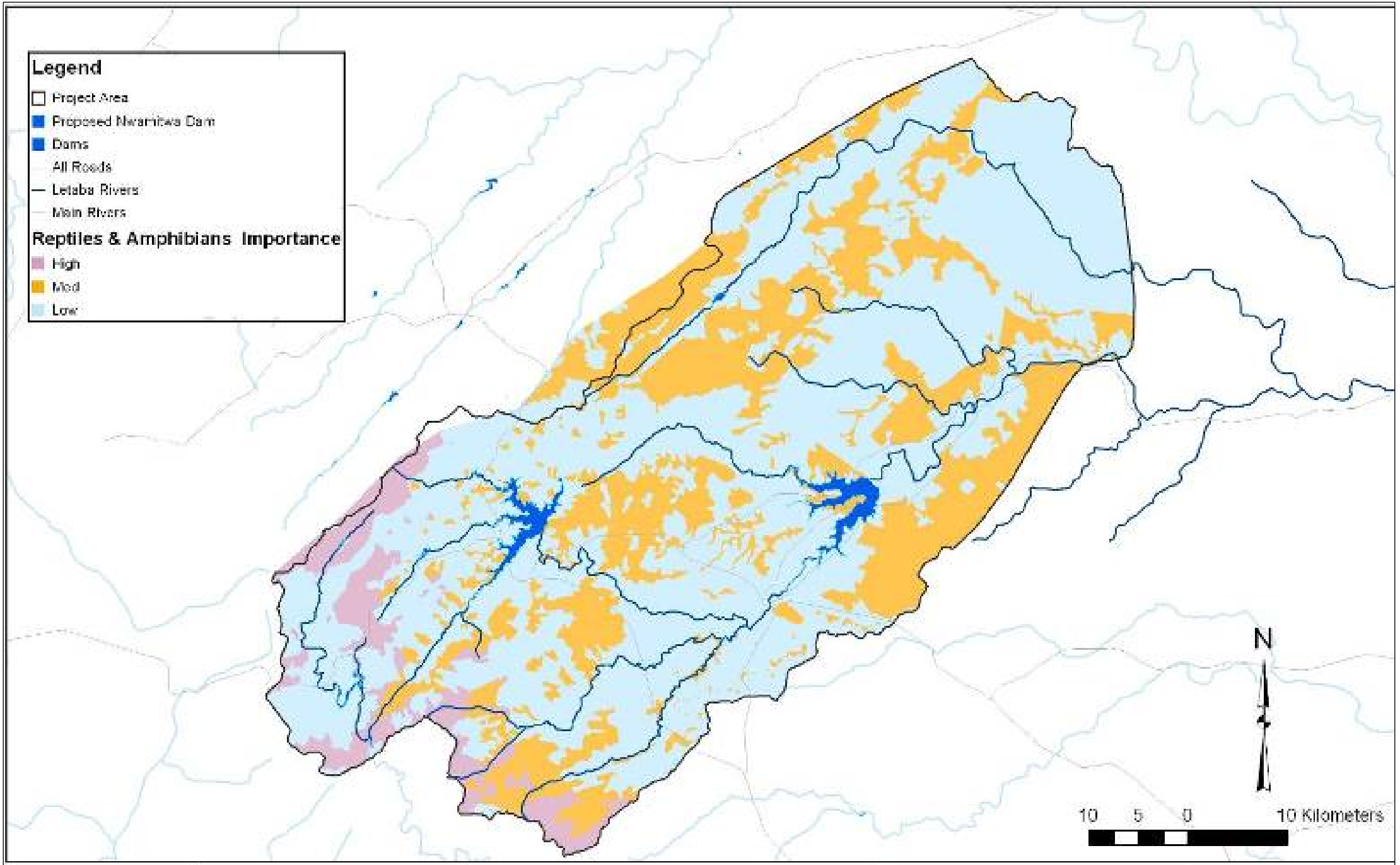
GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)

CONSERVATION IMPORTANCE OF BIRDS

FIGURE 5.8

Date: September 2007
Map Ref: P:\Letaba_Plans.mxd
System: ArcGIS



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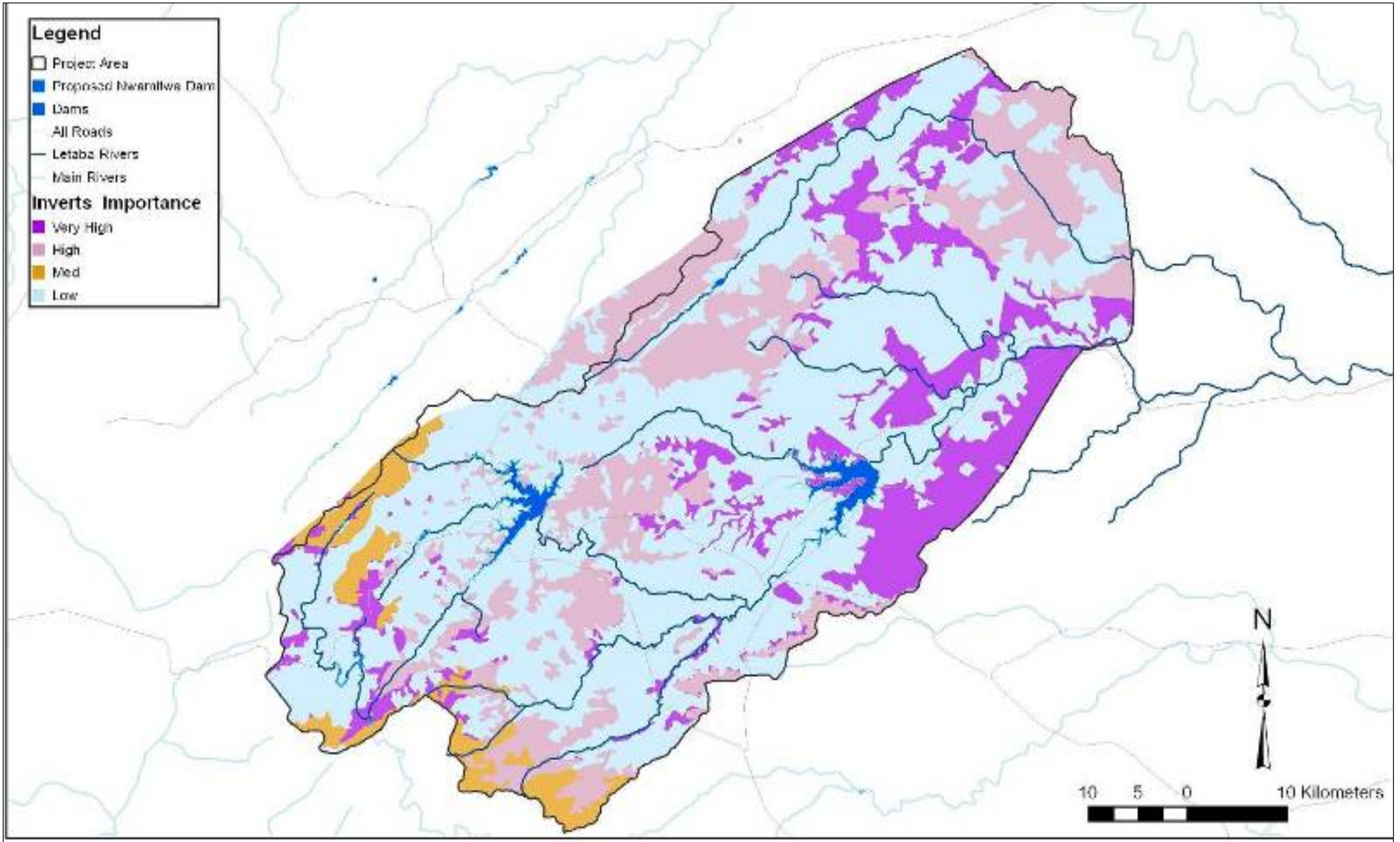
GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)

CONSERVATION IMPORTANCE OF REPTILES & AMPHIBIANS

FIGURE 5.7

Date: September 2007
Map Ref: RV_Letaba_Plants.mxd
System: ArcGIS



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GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)

CONSERVATION IMPORTANCE OF INVERTS

FIGURE 5.8

Date: September 2007
Map Ref: P:\...\Letaba_Plan.aprx
System: ArcGIS

5.5.5 Potential Biodiversity

Table 5.5 provides a summary of the important plant and animal species that could potentially occur in the study area. Applying the precautionary principle, a total of 256 species of Red Data flora and fauna species could potentially occur (147 plant, 45 mammal, 48 bird, 9 reptile & amphibian, and 7 invertebrate). Moreover, at least 107 species could be endemic or near-endemic (locally or regionally), and 284 are likely to be protected.

Table 5.5: Numbers of important biotic taxa potentially present in the project area

Biotic group	Red Data	Endemic/Near-endemic6	Protected	Total
Plants	147	30	176	271
Mammals	45	4	34	64
Birds	48	15	33	62
Reptiles	9	36	8	43
Invertebrates	7	22	33	42
Total:	256	107	284	482

Plants

The numbers and categories of conservation-important species potentially associated with each vegetation type are summarized in **Table 5.6**

[6] Floristic endemism is determined at the scale of Limpopo Province, whilst faunal endemism is determined at a national (SA) or provincial (LIM) scale

Table 5.6: Numbers of conservation-important plant species potentially occurring in each vegetation type

Category	Vegetation Types									
	Granite Lowveld	Gravelotte Rocky Bushveld	Lowveld Rugged Mopaneveld	Northern Escarpment Quartzite Sourveld	Northern Mistbelt Forest	Origstad Mountain Bushveld	Subtropical Freshwater Wetlands	Tsende Mopaneveld	Tzaneen Sour Bushveld	Woodbush Granite Grassland
Red Data	18	18	15	58	35	52	12	16	51	47
Endemic	4	2	3	10	7	8	0	4	11	7
Protected	27	21	21	58	66	41	11	24	59	53
TOTAL	36	31	29	98	83	84	18	33	91	86

Mammals

At least 64 conservation-important mammal species potentially occur within the project area. Of these, a significant proportion (45 species) has Red Data status (**Table 5.5**). However, 22 of these mammals have been assigned the status Data Deficient, as insufficient data are available to assess their Red Data status. Some of these species, particularly the shrews and some of the rodents, may prove to be more common than thought and not justify inclusion on the national Red Data list in the future. Seven species have urgent threat status, three of which are considered Endangered and four are Vulnerable. Only four of the mammals potentially occurring are endemic to South Africa, and 34 are protected, either under the National Environmental Management: Biodiversity Act (Act 10 of 2004) or the Limpopo Environmental Management Act (Act 7 of 2003).

The numbers and categories of conservation-important species potentially associated with each vegetation type are summarized in **Table 5.7**.

Table 5.7: Numbers of conservation-important mammal species potentially occurring in each vegetation type

Category	Vegetation Types									
	Granite Lowveld	Gravelotte Rocky Bushveld	Lowveld Rugged Mopaneveld	Northern Escarpment Quartzite Sourveld	Northern Mistbelt Forest	Ohrigstad Mountain Bushveld	Subtropical Freshwater Wetlands	Tsende Mopaneveld	Tzaneen Sour Lowveld	Woodbush Granite Grassland
Red Data	36	31	34	22	11	29	16	36	34	24
Endemic	0	0	0	3	1	0	0	0	0	3
Protected	27	20	25	16	6	15	5	27	19	17
TOTAL	52	43	49	32	15	39	19	52	46	34

Birds

Approximately 62 conservation-important bird species potentially occur within the study area (**Table 5.5**). Of these, 48 species (77%) have Red Data status. Twenty-five of these have urgent threat status. Two are considered Critically Endangered, deserving urgent conservation attention. One species is considered Endangered and 22 are Vulnerable. Fifteen of the bird species potentially occurring are endemic to South Africa, and 33 are protected under the National Environmental Management: Biodiversity Act (Act 10 of 2004) or the Limpopo Environmental Management Act (Act 7 of 2003).

The numbers and categories of conservation-important species potentially associated with each vegetation type are summarized in **Table 5.8**.

Table 5.8: Numbers of conservation-important bird species potentially occurring in each vegetation type

Category	Vegetation Types									
	Granite Lowveld	Gravelotte Rocky Bushveld	Lowveld Rugged Mopaneveld	Northern Escarpment Quartzite Sourveld	Northern Mistbelt Forest	Ohrigstad Mountain Bushveld	Subtropical Freshwater Wetlands	Tsende Mopaneveld	Tzaneen Sour Lowveld	Woodbush Granite Grassland
Red Data	34	17	28	14	8	18	19	32	34	16
Endemic	1	1	1	9	10	3	0	1	9	8
Protected	24	13	19	10	3	10	12	23	21	12
TOTAL	38	19	31	21	16	20	20	36	42	23

Reptiles & Amphibians

Approximately 43 conservation-important reptiles and amphibians potentially occur within the project area (**Table 5.9**). Nine of these have Red Data status, one of which is considered Extinct. Five species have urgent threat status, and are considered Vulnerable. The remaining three species are Near-threatened. However, a conservation assessment of South Africa's reptiles is underway, and a number of other species may obtain Red Data status in the near future. Thirty-six reptile and amphibian species are endemic to South Africa, of which four are confined to the mountains between Woodbush and the Wolkberg. Eight species are protected under the National Environmental Management: Biodiversity Act (Act 10 of 2004) or the Limpopo Environmental Management Act (Act 7 of 2003).

The numbers and categories of conservation-important species potentially associated with each vegetation type are summarized in **Table 5.9**.

Table 5.9: Numbers of conservation-important reptile and amphibian species potentially occurring in each vegetation type

Category	Vegetation Types									
	Granite Lowveld	Gravelotte Rocky Bushveld	Lowveld Rugged Mopaneveld	Northern Escarpment Quartzite Sourveld	Northern Mistbelt Forest	Ohrigstad Mountain Bushveld	Subtropical Freshwater Wetlands	Tsende Mopaneveld	Tzaneen Sour Lowveld	Woodbush Granite Grassland
Red Data	3	1	2	5	3	1	3	3	2	6
Endemic	3	6	5	25	9	9	0	3	16	27
Protected	7	4	6	2	1	2	4	7	7	2
TOTAL	10	9	10	26	9	11	4	10	21	28

Invertebrates

Twenty Red-Listed invertebrate species (9 butterfly, 6 dragonfly and 5 damselfly species) are known to occur in Limpopo Province (G. Henning pers com, M. Samways pers comm.). However, the brevity of this list is largely due to the paucity of data on the conservation status of invertebrate species, and additional groups that include species of concern in South Africa were therefore also considered in this desktop study. The invertebrate groups considered were scorpions (Arachnida: Scorpiones), trapdoor and baboon spiders (Arachnida: Araneae: Mygalomorphae), dragonflies and damselflies (Odonata), ground beetles (Coleoptera: Carabidae) and butterflies (Lepidoptera: Papilionoidea and Hesperiodea). The assessment thus covers all invertebrate taxa including currently Red Data listed and Protected species in the Province.

At least 42 conservation-important invertebrate species potentially occur within the greater project area (**Table 5.5**). Among these are seven currently Red Data listed species, 22 endemic either to Limpopo Province or to north-eastern South Africa and 33 protected under the National Environmental Management: Biodiversity Act (Act 10 of 2004). None of the invertebrate species predicted for the project area are listed by CITES.

The numbers and categories of conservation-important species potentially associated with each vegetation type are summarized in **Table 5.10**.

Table 5.10: Numbers of conservation-important invertebrate species potentially occurring in each vegetation type

Category	Vegetation Types									
	Granita Lowveld	Gravelotte Rocky Bushveld	Lowveld Ruggd Mopaneveld	Northern Escarpment Quartzite Sourveld	Northern Mistbelt Forest	Origstad Mountain Bushveld	Subtropical Freshwater Wetlands *	Tsende Mopaneveld	Tzaneen Sour Bushveld	Woodbush Granite Grassland
Red Data	0	0	0	3	4	0	0	0	0	4
Endemic	13	13	11	12	2	9	(9)	11	16	17
Protected	30	30	29	18	1	18	(19)	29	33	26
TOTAL	31	31	29	23	5	20	(19)	29	34	32

* All species of concern predicted for this vegetation type would be expected to inhabit only the periphery of the wetlands.

5.5.6 Conservation Importance per vegetation type

Plants

The conservation importance of each of the species predicted for the project area is indicated in **Appendix A-1**. Red Data categories are in accordance with IUCN 2001 categories (IUCN, 2000) and are based on the South African National Biodiversity Institute's interim Red Data list (SANBI, 2007).

Vegetation types are ranked and assigned importance ratings ranging from Medium to Very High (**Table5.15**).

Table 5.11: Plant importance per vegetation type

Importance value	Number of species									
	Granite Lowveld	Gravelotte Rocky Bushveld	Lowveld Rugged Mopaneveld	Northern Escarpment Quartzite Sourveld	Northern Mistbelt Forest	Origstad Mountain Bushveld	Subtropical Freshwater Wetlands	Tsende Mopaneveld	Tzaneen Sour Bushveld	Woodbush Granite Grassland
Very high	0	0	0	2	1	1	0	0	2	2
High	4	3	3	8	7	5	1	3	8	5
Med	6	6	4	17	12	11	4	6	12	15
Low	26	22	22	71	63	66	13	24	69	64
RANK	6	8	9	1	4	5	10	7	2	3
Overall importance	High	High	High	Very High	High	High	Med	High	Very High	Very High

The three most important vegetation types for potential plants of conservation concern are Northern Escarpment Quartzite Sourveld, Woodbush Granite Grassland (both grassland types), and Tzaneen Sour Bushveld (savannah type). The Very High importance value of the grassland vegetation types is driven by the possible occurrence of the leguminous suffrutex Argyrolobium muddii (Endangered) and the ground orchid Disa aristata (Vulnerable, Protected, Endemic). The epiphytic orchid Oberonia disticha (Near-Threatened, Protected, Endemic) and the succulent Aloe monotropa (Vulnerable, Protected, Endemic) are the species that, if present, would give the savannah type a rating of Very High importance.

Northern Mistbelt Forest, Origstad Mountain Bushveld, Granite Lowveld, Tsende Mopaneveld, Gravelotte Rocky Bushveld and Lowveld Rugged Mopaneveld appear to be slightly less important, whilst Subtropical Freshwater Wetlands are of least importance **(Figure 5.4).**

Mammals

The conservation importance of each of the mammal species predicted for the project area is indicated in **Appendix A-2**. Red Data status was derived from Friedman & Daly (2004) and is in accordance with IUCN 2001 categories (IUCN, 2000).

Vegetation types are ranked and assigned importance ratings ranging from Low to High (**Table 5.12**).

Table 5.12: Mammal importance per vegetation type

Importance Value	Number of species									
	Granite Lowveld	Gravelotte Rocky Bushveld	Lowveld Rugged Mopaneveld	Northern Escarpment Quartzite Sourveld	Northern Mistbelt Forest	Ohrigstad Mountain Bushveld	Subtropical Freshwater Wetlands	Tsende Mopaneveld	Tzaneen Sour Bushveld	Woodbush Granite Grassland
Very High	1	0	0	1	1	0	0	1	0	1
High	18	15	17	8	3	13	9	18	17	10
Medium	33	28	32	22	11	25	10	33	29	23
Low	0	0	0	0	0	0	0	0	0	0
RANK	1	8	6	4	5	9	10	2	7	3
Overall Importance	High	Med	Med	High	High	Med	Low	High	Med	High

The most important vegetation types for conservation-important mammals appear to be two savannah types, namely Granite Lowveld and Tsende Mopaneveld **(Figure 5.5)**. These importance values are driven by the presence of an Endangered mammal, Tsessebe (Damaliscus lunatus), and a number of other Vulnerable mammals, within protected areas in the Lowveld (e.g. Ndzalama Private Game Reserve, Hans Merensky Game Reserve). Two high-altitude grassland types also have High importance, particularly because of the presence of an Endangered, locally endemic mammal: Gunning's Golden Mole (Neamblysomus gunningi). Even though Northern Mistbelt Forest has the lowest number of conservation-important mammals, it has a High importance value because it supports significant population of an Endangered mammal: Samango Monkey (Cercopithecus mitis labiatus). Four

savannah vegetation types have a Medium importance value because of the occurrence of numerous Vulnerable, Near Threatened and Data Deficient mammals. Subtropical Freshwater Wetlands rate as having Low importance mainly because of the small size of the wetlands, and the low number of aquatic-associated mammals.

Birds

The conservation importance of each of the bird species predicted for the project area is indicated in **Appendix A-3**. Red Data status was derived from Barnes (2000) and is in accordance with IUCN 2001 categories (IUCN, 2000).

Vegetation types are ranked and assigned importance ratings ranging from Low to High (**Table 5.13**).

Table 5.13: Bird importance per vegetation type

Importance Value	Number of species									
	Granite Lowveld	Gravelotte Rocky Bushveld	Lowveld Rugged Mopaneveld	Northern Escarpment Quartzite Sourveld	Northern Mistbelt Forest	Ohrigstad Mountain Bushveld	Subtropical Freshwater Wetlands	Tsende Mopaneveld	Tzaneen Sour Bushveld	Woodbush Granite Grassland
Very High	1	0	1	1	1	0	0	1	0	1
High	23	14	21	8	7	9	4	19	14	9
Medium	12	3	7	5	0	9	16	14	21	6
Low	2	2	2	6	6	2	0	2	6	6
Very Low	0	0	0	1	2	0	0	0	0	1
RANK	1	8	3	5	6	9	10	2	7	4
Overall Importance	High	Med	High	High	High	Med	Low	High	Med	High

As with mammals, the most important vegetation types for conservation-important birds are savannahs, particularly Granite Lowveld, Tsende Mopaneveld and Lowveld Rugged Mopaneveld (**Figure 5.10**). The High importance value for these vegetation types is most applicable to protected areas, particularly for Vulnerable birds of prey

that rarely breed outside of these areas. One Endangered bird, the Saddle-billed Stork (Ephippiorhynchus senegalensis) is also most likely to breed along rivers in protected areas. The high-altitude grasslands have a High importance value because of the presence of a Critically Endangered bird, the Blue Swallow (Hirundo atrocaerulea), which is an irregular breeding visitor or passage migrant to the Haenertsburg grasslands and the Wolkberg range. The sixth vegetation type that has a High importance rating is Northern Mistbelt Forest. This importance value is driven by the presence of a stable population of Cape Parrot (Poicephalus robustus), which is Endangered. Three other savannah types have a Medium importance value, while Subtropical Freshwater Wetlands has the lowest importance for conservation-important birds.

Reptiles and Amphibians

The conservation importance of each of the reptiles and amphibians predicted for the project area is indicated in **Appendix A-4**. Red Data status was derived from Minter et.al. (2004), Branch (1988) and the IUCN 2004 list (www.redlist.org), and is in accordance with IUCN 2001 categories (IUCN, 2000).

Vegetation types are ranked and assigned importance ratings ranging from Low to High (**Table 5.14**).

Table 5.14: Reptile and Amphibian importance per vegetation type

Importance Value	Number of species									
	Granite Lowveld	Gravelotte Rocky Bushveld	Lowveld Rugged Mopaneveld	Northern Escarpment Quartzite Sourveld	Northern Mistbelt Forest	Ohrigstad Mountain Bushveld	Subtropical Freshwater Wetlands	Tsende Mopaneveld	Tzaneen Sour Bushveld	Woodbush Granite Grassland
Very High	0	0	0	1	1	0	0	0	0	1
High	3	1	2	5	3	1	3	3	3	6
Medium	1	0	1	1	1	0	1	1	1	1
Low	6	9	8	19	4	10	0	6	18	20
RANK	5	10	8	2	3	9	7	6	4	1
Overall Importance	Med	Low	Low	High	High	Low	Med	Med	Med	High

High-altitude grasslands and Northern Mistbelt Forests appear to be the most important vegetation types for reptiles and amphibians of conservation concern (Error! Reference source not found.). Woodbush Granite Grassland has the highest importance value, followed closely by Northern Escarpment Quartzite Sourveld. The High importance value of these vegetation types is driven by the possible persistence of Eastwood's Long-tailed Seps (Tetradactylus eastwoodae), which is currently considered Extinct, but is thought by some herpetologists to persist in the area (Vincent Egan pers.comm.). Two Vulnerable reptiles, Woodbush Legless Skink (Acontophiops lineatus) and Methuen's Dwarf Gecko (Lygodactylus methueni), and a Vulnerable amphibian, the Northern Forest Rain Frog (Breviceps sylvestris), are other key species that contribute to the High importance rating of this vegetation type. Three savannah types are considered to have a Medium importance, and another three rate as Low.

Invertebrates

The conservation importance of each of the species predicted for the site is indicated in **Appendix A-5**. Many of the taxa have not yet been evaluated for Red Data status either nationally or by the IUCN, while others have been evaluated either nationally or

by the IUCN, and some by both. Personal judgment thus had to be exercised as to which Red Data assessment should be used for these evaluations, as the outcome in some cases differed greatly depending on whether the National or IUCN rating was applied. Differences were due in some cases (e.g. some Odonata) to species that are widespread further north being represented in South Africa (at the very limit of their distributions) by extremely limited populations, while in other cases (e.g. some butterflies) the differences were due mainly to national assessments being more up-to-date than the IUCN. The decision was thus taken to use the IUCN evaluations for the Odonata, but national assessments for the butterflies. It should be noted that if Red List assessments had been carried out for the non-evaluated taxa, many (with the probable exception of Opistophthalmus glabrifrons, O. wahlbergi, Opistacanthus validus, Ceratogyrus bechuanicus, C. brachycephala and the more widespread beetle species) would, on the basis of limited distributions and in some cases extreme rarity, then receive a higher importance ranking than has presently been assigned.

Vegetation types are ranked and assigned importance ratings ranging from Low to Very High (**Table 5.15**). Some caution should however be exercised in applying these rankings:

- The large number of Dromica species predicted for Granite Lowveld and Gravelotte Rocky Bushveld may be an artefact of high collecting effort in the vicinity of Ofcolaco , which falls within the same band of Granite Lowveld vegetation (and adjacent to a patch of Gravelotte Rocky Bushveld) as the proposed dam site. The inclusion of both widespread and restricted species of Dromica on the protected species list may thus erroneously raise the ranking of these vegetation types.

- The importance of the Subtropical Freshwater Wetlands from a terrestrial invertebrate perspective is largely due to the probability of tiger beetle species, particularly Dromica, utilizing the fringe of the wetlands for foraging, and once again the high number of Dromica species predicted for Granite Lowveld, within which the only area of Subtropical Freshwater Wetlands in the project area falls, may artificially raise the importance of this vegetation type.

Table 5.15: Invertebrate importance per vegetation type

Importance value	Number of species									
	Granita Lowveld	Gravelotte Rocky Bushveld	Lowveld Rugged Mopaneveld	Northern Escarpment Quartzite Sourveld	Northern Mistbelt Forest	Ohrigstad Mountain Bushveld	Subtropical Freshwater wetlands*	Tsende Mopaneveld	Tzaneen Sour Bushveld	Woodbush Granite Grassland
Very high	0	0	0	3	2	0	0	0	0	4
High	3	3	3	0	1	0	(3)	3	3	0
Med	28	28	26	19	1	19	(16)	26	31	27
Low	0	0	0	1	1	1	0	0	0	1
Score7	67.00	41.75	37.75	29.25	16.75	19.00	47.50	47.00	43.00	48.25
RANK	1	6	7	8	10	9	3	4	5	2
Overall importance	Very High	High	High	Med	Med	Med	Very High	Very High	High	Very High

* All species of concern predicted for this vegetation type would be expected to inhabit only the periphery of the wetlands.

The most important vegetation types for potential invertebrates of conservation concern are thus Granite Lowveld, Woodbush Granite Grasslands, Tsende Mopaneveld and possibly the Subtropical Freshwater Wetlands (Error! Reference source not found.).

5.6 DEMOGRAPHIC PROCESSES

Demographic processes relate to the number of people and composition of a community and include an overview of the population size and the educational profile of the affected communities.

The proposed project mainly falls within the Greater Letaba Local Municipality (LIM332) and the Greater Tzaneen Local Municipality (LIM333).

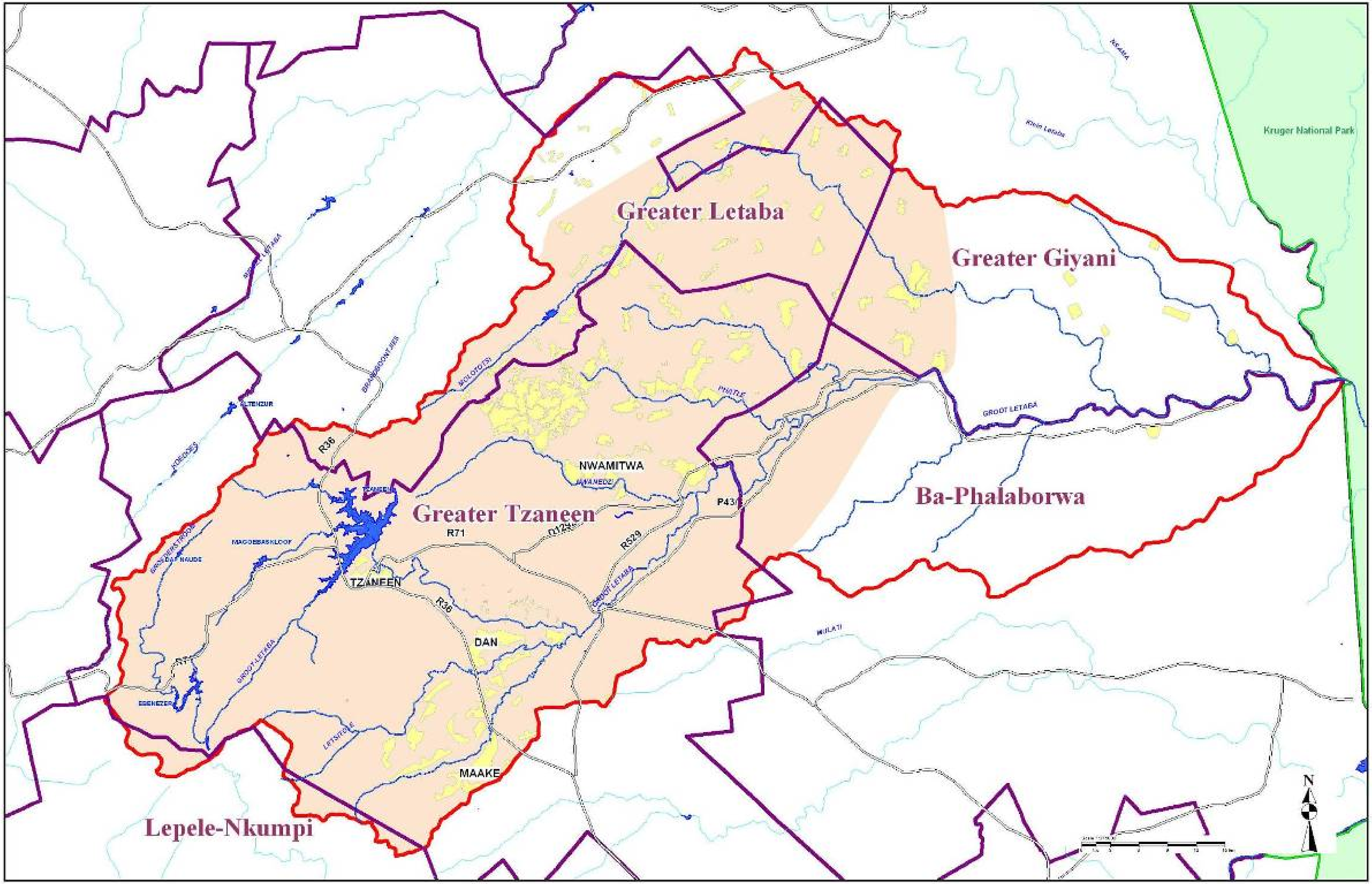
xxx

[7] Based on scoring system incorporating importance levels and probability of occurrence

Small parts of the Greater Giyani (NP331) and the Ba-Phalaborwa (N334) municipalities also fall in the study area (**Figure 5.9**). These last two mentioned municipalities do not form part of the demographic and economic discussions in this Chapter, in order not to skew the social profile. The discussion of only the Greater Tzaneen and Letaba Municipalities will give a more realistic reflection of the communities in the study area. However, the Integrated Development Plans (IDPs) of all four local municipalities will be accessed.

The Greater Tzaneen and Letaba Local Municipalities form part of the Mopani District Municipality (DC33) in the Limpopo Province. The Limpopo Province (LP) is the northern most province of the Republic of South Africa and is bordered by Botswana to the west and north-west, Zimbabwe to the north, and Mozambique to the east. To the south lies the Gauteng Province. The locality of the LP makes it the link between South Africa and other African countries.

The Greater Letaba Local Municipality (GLLM) covers an area of approximately 1 891 km^2 and consists of 26 wards. The Greater Tzaneen Local Municipality (GTLM) is approximately 3 242 km^2 in size and comprises of 34 wards in total. These municipalities are in the Groot Letaba catchment, which fall within the Luvuvhu-Letaba Water Management Area (WMA).



Legend
- Project Area
- Groot Letaba Catchment
- Towns and Villages
- Kruger National Park
- Dams
- Rivers
- Roads

water & forestry
Department: Water Affairs and Forestry
REPUBLIC OF SOUTH AFRICA

ILISO CONSULTING

GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)

MUNICIPALITIES

FIGURE 5.9

The discussion of this section is guided by **Table 5.16**, which provides an overview of the population characteristics of the two main local municipalities within which likely areas to be provided with domestic water supplies fall. The Greater Letaba Local Municipality (GLLM) and Greater Tzaneen Local Municipality (GTLM) are discussed in relation to South Africa (SA) as a whole, the province and the district municipality.

Table 5.16: Summary of Population Characteristics

	SA	LP	MDM	GLLM	GTLM
AREA SIZE (KM2)	1 219 912	122 839 (10% OF SA)	11 098 (9% OF LP)	1 891 (17% OF MDM)	3 242 (29% OF MDM)
TOTAL POPULATION	47 390 900	4 994 326 (11% OF SA)	1 060 409 (21% OF LP)	220 094 (21% OF MDM)	375 580 (35% OF MDM)
POPULATION DENSITY (PEOPLE PER KM2)	38.9	40.7	95.5	116.4	115.8
TOTAL HOUSEHOLDS	11 205 705	1 193 351	261 070	53 743	97 422
AVG. PERSONS PER HOUSEHOLD	4.0	4.2	4.1	4.1 (4.9)*	3.9 (5.1)*
POPULATION GROUP	BLACK AFRICAN (79.5%)	BLACK AFRICAN (97.0%)	BLACK AFRICAN (97.5%)	BLACK AFRICAN (98.9%)	BLACK AFRICAN (97.6%)
GENDER	FEMALE (50.8%)	FEMALE (54.3%)	FEMALE (54.3%)	FEMALE (55.1%)	FEMALE (54.2%)
AGE	0-19 (42.6%)	0-19 (52.2%)	0-19 (51.5%)	0-19 (53.9%)	0-19 (48.7%)

*according to population projections by Pieterse, du Toit and Associates cc Town and Regional Planners as reflected in the MDM IDP

The Limpopo Province (LP) covers an area of approximately 122 839 km², with a total population of approximately 4 994 326 and average population density of 40.7 people per km². The Province is largely rural in nature, with only 11% of its population residing in urban areas. The predominant population group is Black African (97.0%)

followed by White (2.6%). Females dominate at 54.3%. More than half (52.2%) of the total population is below the age of 19.

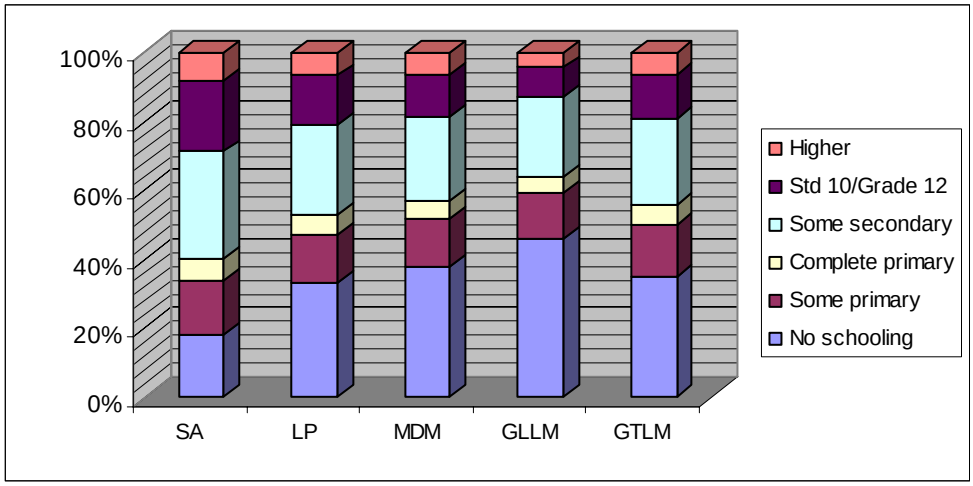
The Mopani District Municipality (MDM), which is situated within the LP, extends over 11 098km² and has a total population of approximately 1 060 409 with a high population density of 95.5 people per km². The racial distribution within the MDM, much like the LP as a whole, consists of a large majority of Black African (97.5%) followed by a distribution of 2.3% White. As is the case with the LP as a whole, more than half (51.5%) of the total population is below the age of 19. Again females dominate at 54.3%.

Greater Tzaneen and Greater Letaba LMs are the most densely populated municipalities in the district. The GTLM has almost half of the district population. This municipality extends over 3 242 km² with a total population of 375 580 at much the same population density as the GLLM with 115.8 people per km². There are about 110 settlements with an average of approximately 3 700 people per settlement. Approximately 24 settlements have 5 000 and more people (Pieterse, du Toit and Associates cc as quoted in the MDM). The racial distribution remains in line with the racial distribution of the Province and District Municipality as a whole with 97.6% Black African and 2.1% White. Again the majority (48.7%) of the total population is below the age of 19, as well as 54.2% being female.

The GLLM covers an area of approximately 1 891 km² with a total population of 220 094 people at a fairly high population density of approximately 116.4 people per square kilometre. There are about 80 settlements with an average of approximately 2 700 people per settlement. Approximately nine settlements have 5000 and more people (Pieterse, du Toit and Associates cc as quoted in the MDM IDP). The predominant population group is Black African (98.9%), followed by White (1.0%). Again more than half (53.9%) of the total population are aged 19 or younger. There are more females (55.1%) than males.

An overview of the educational profile of the local municipalities in the study area in relation to the district, the province and South Africa as a whole, is presented in **Table 5.10**.

Figure 5. 10 : Overview of the Educational Profile



A third (33.1%) of the adult population in the LP has no schooling, closely followed by just over a quarter (26.3%) of the adult population who completed at least some secondary schooling. A total of 20.9% completed an education equivalent to Grade 12 (14.1%) and higher (6.8%). More or less the same educational profile holds true for the MDM, where 37.8% of the adult population had no schooling, followed by 24.2% who completed some secondary schooling. A total of 18.8% completed Grade 12 or higher.

Within the GLLM close on half of the adult population (45.8%) has no schooling. Close on a quarter (23.4%) completed some secondary schooling. In the GTLM, 35.0% of the adult population had no schooling, followed by 25.3% who completed some secondary education.

5.7 MUNICIPAL SERVICES

The GLLM municipal services profile looks much the same as that of the MDM and the province as a whole, as is the case for the GTLM (**Table 5.17**).

Table 5.17: Overview of Municipal Services

	LP	MDM	GLLM	GTLM
ENERGY COOKING	WOOD (57.1%)	WOOD (70.0%)	WOOD (78.8%)	WOOD (69.1%)
ENERGY HEATING	WOOD (57.8%)	WOOD (67.2%)	WOOD (74.9%)	WOOD (66.7%)
ENERGY LIGHTING	ELECTRICITY (63.2%)	ELECTRICITY (68.1%)	ELECTRICITY (65.9%)	ELECTRICITY (69.1%)
REFUSE	OWN DUMP (66.7%)	OWN DUMP (61.6%)	OWN DUMP (64.2%)	OWN DUMP (64.5%)
TOILET	PIT WITHOUT VENTILATION (49.0%)	PIT WITHOUT VENTILATION (37.8%)	PIT WITHOUT VENTILATION (51.6%)	PIT WITHOUT VENTILATION (45.5%)
WATER	PIPE IN YARD (15.5%)	PIPE IN YARD (16.1%)	PIPE IN YARD AND <200M (13.8%)	PIPE IN YARD (15.7%)

Despite the fact that almost two thirds of all households (63.2%) within the LP have access to electricity and make use of it for lighting, the majority of households make use of wood for cooking (57.1%) and heating (57.8%). In terms of other municipal services, two thirds (66.7%) of households make use of their own refuse dump for waste removal.

The MDM profile for energy sources is the same as that of the province as a whole. Also, in the MDM approximately 61.6% of all households make use of their own refuse dump. There is an almost equal split between households that have no access to sanitation services (34.7%) and those who have to use a pit latrine without ventilation (37.8%).

Pit latrines are below Reconstruction and Development Programme standards (RDP) standard and could contaminate ground water. The RDP standard is Ventilation Improved Latrines (VIPs), and above RDP standard is a water-borne sewage system.

Water pollution in the district therefore affects most people because many of them stay in the rural areas and depend on river water. The major cause of this problem is the sewage leakage into the rivers, streams and groundwater.

Very few households have direct access to water within either their dwelling or yard and have to make use of a communal standtap, a borehole or a river/stream. Some villages make use of river water because of the quality of ground water they get at the communal standtap. Water is generally fetched by women or by young boys. The boys load 20 litre jerrycans on donkey carts and sell the jerrycans of water in the villages.

The GLLM IDP states that 47% of households have access to less than 10 litres of water per day, a further 47% to between 10 litres and 25 litres per day, while only 6% of households are above the RDP standard. Of the households, 35% of households live within 200 - 500m from a water source, while 28% reside further than 500m from a source. One can assume that GTLM has a similar profile.

The access to water in these communities is therefore below standard for most. The Section 9(1) Regulations of the WSA (Guidelines for Compulsory National Standards) set the minimum standard for basic water supply as "*a minimum quantity of potable water of 25 litres per person per day or 6 kilolitres per household per month (households with les than eight occupants)*…"

Concerning the distance of a tap from home, the DWAF has set and implemented a maximum distance of 200 m away from a household as policy.

The shortage of bulk water supply affects settlements, agricultural production of commercial farmers and emerging black farmers, as well as the tourism industry between the Drakensberg Escarpment and the Kruger National Park. Even if the necessary supply infrastructure is built, the water will not be available to meet the demand. In the Letaba River catchment 14.8 million m^3 per annum was allocated, on an ad hoc basis, for release from Tzaneen Dam to the Kruger National Park but little if any of these releases reached the Park with real beneficial effect.

The provision of bulk water supply to villages is therefore a priority to the affected municipalities. The MDM IDP states that "*Water has emerged as probably the most pressing need, with causal factors for inadequate supply ranging from insufficient capacity of purification plants, to absence of reticulation networks. The collapse and/or threatening collapse of water schemes are mainly caused by:*

- *lack of maintenance;*
- *inadequate cost recovery;*
- *unauthorised water connections;*
- *The fragmented water supply system (i.e. schemes are not connected or linked) – this maybe clarifies why there might be a shortage of bulk water supply in one area, while a surplus exists in another;*
- *Lack of cooperative governance. "Local government is supposed to set the agenda, the DWAF is the licensing authority and supplier of raw water and the environmental aspects need to be approved by DEAT. The Treasury plays a major role in financial monitoring and administration of surpluses or deficits. Water Boards operate as abstractors, purifiers and distributors of the raw water (reporting to the DWAF), whilst municipalities can undertake these functions themselves. This practice in the institutional arrangements does not lend themselves to cooperation between organisations, especially where there is an overlap of responsibility and organisations deem it necessary to protect their territory, rather than to cooperate and synergise their efforts" (Applying the World Commission on Dams Report in South Africa, 2004).*"

5.8 ECONOMIC CONTEXT

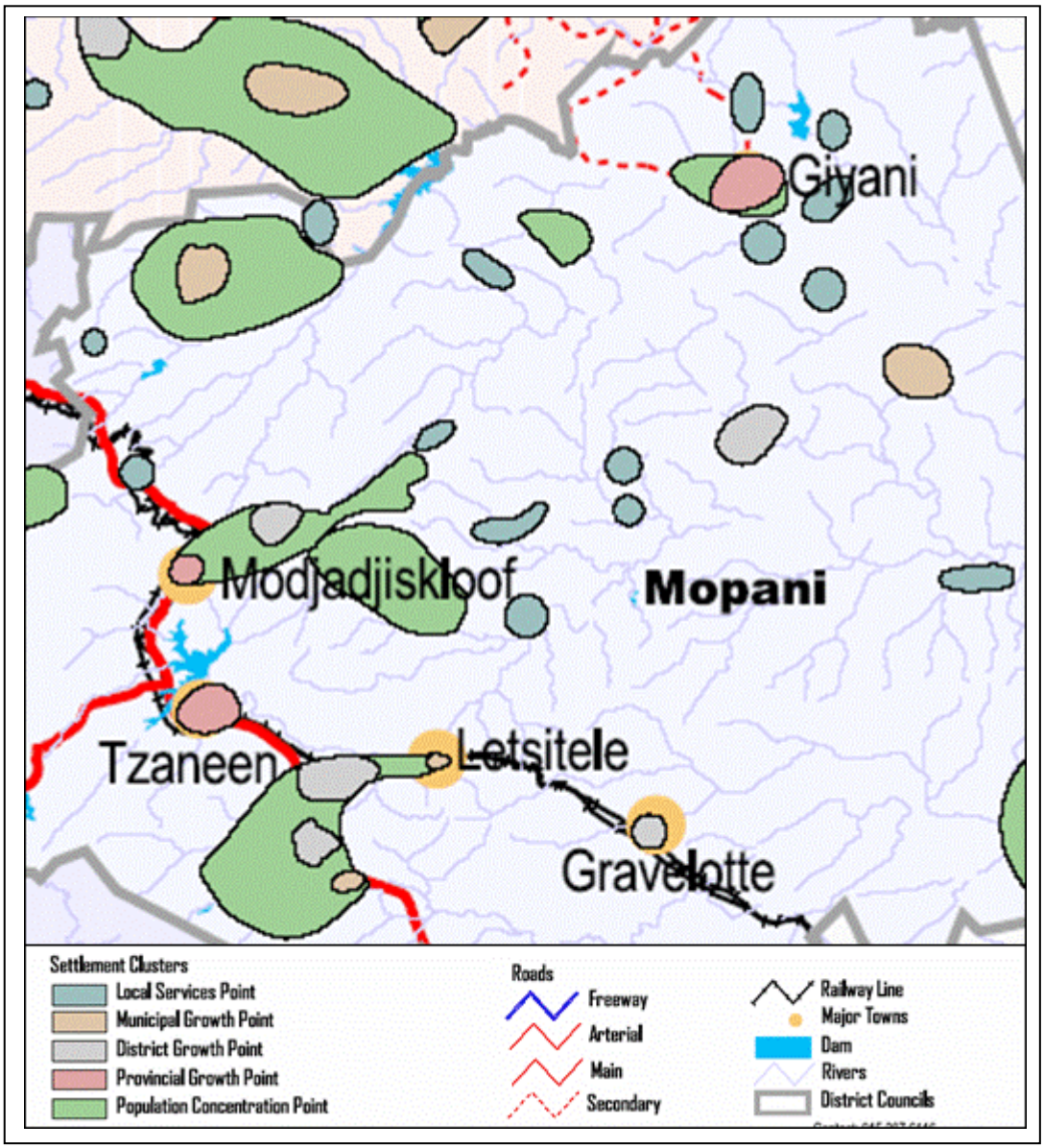
5.8.1 Population and settlement pattern

An overview of the population characteristics are provided in **Table 5.16**. Within Greater Tzaneen Local Municipality, the Limpopo Provincial Rationale identified six growth points (see **Figure 5.11**). The Growth Points are identified as being located within first order settlements. The First Order Settlements (Growth Points) are

individual settlements or a group of settlements located relatively close to each other where meaningful economic, social and institutional activities and a substantial number of people are grouped together. The growth point settlements are further classified as Provincial, District and Municipal Growth Points.

The town of Tzaneen is the only provincial growth point. The Provincial Growth Points are settlements with relatively large economies employing a large residential area. These settlements have regional and some Provincial service delivery elements. This includes at least local municipal offices which perform all municipal services such as water, electricity, sanitation, refuse removal, road maintenance, etc.

The District growth points within the study area are Nkowankowa and Lenyenye, and three Municipal growth points are Haenerstburg, Burgersdorp and Letsitele. Within Greater Tzaneen there are also two population concentration points, namely: Mogoboya and Nwamitwa.



Source: Pieterse du Toit and Associates, 2002

Figure 5. 11: Tzaneen Local Municipality Growth Points

The essential features of the current settlement pattern can be summarised as follows (Greater Tzaneen SDF, 2007):

- Political interventions mainly between 1960 and 1980, have resulted in a polarised and unnatural settlement pattern where most of the poor people live in small rural settlements (villages);

- Low levels of income and lack of skills inhibit the development of local economic activity at the village level, which confines the potential for sustainable growth within settlements (villages);

- People survived by migrating to work in other areas or by commuting while leaving their families in the village; and

- With the constitutional change in 1994, higher income people relocated to Tzaneen town and other areas. Other people with less income have moved to the fringes of Nkowankowa and Lenyenye where they squat next to job opportunities.

The implication of this settlement pattern is that the vast majority of settlements within GTM area are economically unsustainable, but they accommodate people who are desperately in need of improved infrastructure and improved social services. Economic growth stimulation will be confined to those villages where the residents reflect an adequate range in the distribution of their income and skills and where local resources can be converted to consumer and manufactured goods.

5.8.2 Employment profile

A person that is employed receives remuneration and a part of that remuneration is regarded as disposable income. Disposable income can be defined as the net income available to a particular person to either save or spend. Employment within an area can therefore be translated into disposable income, which impacts directly on household consumption. Employment is therefore a key indicator.

Table 5.18 indicates the employment status of the population for each of the local municipalities within the Mopani District.

Table 5.18: Percentage distribution of employment status, 1996 and 2001

Local Area	Employed		Unemployed		Not Working/Other	
Year	1996	2001	1996	2001	1996	2001
Greater Giyani	9.2%	16.2%	9.5%	24.7%	81.4%	59.1%
Greater Letaba	9.0%	22.7%	8.9%	16.6%	82.1%	60.7%
Greater Tzaneen	16.3%	29.4%	9.5%	21.7%	74.3%	49.0%
Ba-Phalaborwa	24.5%	36.9%	10.1%	25.0%	65.4%	38.1%
Maruleng	12.8%	27.9%	9.4%	18.7%	77.8%	53.4%
MOPANI DISTRICT	14%	26%	9%	21%	77%	52%

Source: Census 1996, 2001

In Greater Tzaneen, nearly 30% of the population are unemployed. (Census 2001 as in Tzaneen SDF, 2007).

This unemployment rate also seems to be growing each year while the provincial and local economy's ability to create jobs is not keeping pace with job requirements.

Table 5.19 provides an indication of the labour force (economic active population) per sector and indicates that employment in Greater Tzaneen is mostly generated in the agriculture sector, followed by community, personal and social services sector and the wholesale, retail and trade sector.

Table 5.19: Labour Force per sector, 2001

Industry	Greater Giyani	Greater Letaba	Greater Tzaneen	Ba-Phalaborwa	Maruleng	Mopani District
Agriculture	1797	10798	19321	3286	6077	41279
Mining	233	55	804	5977	131	7200
Manufacturing	640	1371	7741	2653	465	12870
Electricity and water	357	299	471	264	78	1469
Construction	1350	1315	2771	1673	572	7681
Wholesale and retail trade	2950	4632	8547	3433	1194	20756
Transport and communication	620	742	1669	765	1117	4913
Financial and business services	1208	819	3018	1695	435	7175
Community, social and personal services	8042	4583	10686	5702	2579	31592
Private Households	1905	1522	5174	2592	1153	12346
Undetermined	1799	1336	5069	2666	1087	11957
Not applicable	108324	93255	157167	52385	38431	449562
TOTAL	129225	120727	222438	83091	53319	608800

Source: Census 2001

5.8.3 Economic profile

The sectoral GDP contribution per sector for each municipality in the Mopani District is represented in **Table 5.20**.

Table 5.20: GDP contribution (in R million) per sector, 2004

Industry	Greater Giyani	Greater Letaba	Greater Tzaneen	Ba-Phalaborwa	Maruleng	Mopani District
Agriculture	68	175	494	99	217	1055
Mining	119	51	462	8222	114	8969
Manufacturing	153	269	985	867	97	2373
Electricity & water	143	73	249	217	33	715
Construction	131	75	1013	179	28	1428
Wholesale & retail trade	448	350	1474	716	214	3204
Transport & communication	295	383	708	465	523	2376
Finance and business services	583	229	1402	1030	226	3472
Community, social & personal	172	116	492	408	101	1290
Government services	901	393	1159	621	408	3485

Source: Quantec database, 2006

In relation to the other municipalities within the Mopani District, Greater Tzaneen Municipality contributed the majority of the GDP (approximately 30%) to the Mopani District in 2006. Greater Tzaneen also contributed the most to the District's share of GDP from the following sectors in the economy: wholesale, retail and trade sector; finance and business services sector; government services; construction sector; manufacturing sector; agricultural sector; and community, social and personal services sector.

Table 5.21 indicates the growth in contribution to the GDP per sector as well as the Tress Index in for each local municipality and the District. (The Tress Index indicates the level of concentration of diversification in an economy. It is estimated by ranking the sectors according to their contributions to GDP or employment adding the values

cumulatively and indexing them. An index of zero represents a totally diversified economy, while a number closer to 100 indicates a high level of concentration.)

Table 5.21: Percentage sectoral GDP growth per annum (1997-2004)

Industry	Greater Giyani	Greater Letaba	Greater Tzaneen	Ba-Phalaborwa	Maruleng	Mopani District
Agriculture	9.6%	5.1%	5.7%	-0.6%	5.0%	4.9%
Mining	5.1%	-2.6%	3.0%	5.2%	2.9%	5.0%
Manufacturing	5.9%	4.6%	3.0%	10.8%	8.4%	6.0%
Electricity & water	4.6%	4.8%	2.5%	5.4%	3.4%	4.0%
Construction	-1.0%	-0.6%	7.4%	-1.7%	-2.2%	4.2%
Wholesale & retail trade	6.6%	1.0%	4.6%	7.9%	4.9%	5.1%
Transport & communication	15.8%	14.3%	8.9%	15.1%	8.4%	11.4%
Finance and business services	2.4%	4.3%	4.2%	3.2%	8.8%	3.8%
Community, social & personal services	3.4%	6.2%	6.7%	9.3%	3.9%	6.7%
General government services	1.4%	1.1%	2.6%	3.6%	8.5%	2.8%
Tress Index	45	46	36	72	53	44

Source: Quantec database, 2006 and Kayamandi calculations

In comparison with other municipalities, the economy of Greater Tzaneen is highly diversified, with a Tress Index of 36. All the sectors in the Greater Tzaneen Municipality indicated a positive growth. The sectors with the largest growth in contribution are the Transport and Communication Sector (8.9%); the Construction sector (7.4%), and the community, social and personal services sector (6.7%). Greater Tzaneen is also the only municipality in which there was positive growth in the Construction Sector. It should be noted that Tzaneen is currently the largest town in the Mopani District with the largest population, which directly relates to a higher demand for construction related activities.

5.8.4 Development perspective

The Groot Letaba River catchment is a highly productive agricultural area with mixed farming including cattle ranching, game farming, dryland crop production and a wide variety of crops produced under irrigation. Citrus and sub-tropical fruit are most widely produced under irrigation together with vegetables and other high-value crops such as tea. Agriculture and the irrigation sector in particular is the main base of the economy of the region and provide the major portion of local employment opportunities.

Irrigation is the largest water user and will remain so for the foreseeable future. Numerous irrigation schemes and irrigation boards exist in the catchment, some of which are supplied from storage and others depend on run-of-river abstractions. The irrigation schemes earmarked for revitalisation in Greater Tzaneen Local Municipality include: Thabina, Solani, Berlyn Citrus, Coombe Bank, Mariveni, and Naphuno farms. The majority of the irrigation schemes within the Mopani District are situated in Greater Tzaneen where the majority of intensive agriculture (mostly citrus fruit) is grown in the District.

The timber industry in the Letaba River Catchment area includes a significant capital investment in infrastructure including sawmills and provides highly valued employment opportunities. Afforestation (including indigenous) decreases the mean annual runoff with the maximum impact being on low flow periods during seasons of relatively low rainfall.

Greater Tzaneen also has numerous areas with exceptional natural beauty, with considerable untapped tourism potential.

5.9 LAND USE ACTIVITIES

5.9.1 Agriculture

The total land area of the Limpopo Province is 11 960 600 hectares of which 88.2 % (10,548,290 ha) constitute farmland. Irrigated farming is predominant in the province (http://www.lda.gov.za/index).

The land capacity categorization constitutes the following proportions (Department of Agriculture, Limpopo Province Strategic Plan 2005/2006):

- 37,7% suitable for arable farming
- 50,1% suitable for grazing
- 12, 2% suitable for wildlife.

"*Limpopo is mostly semi-arid, and is prone to drought and floods. In this respect irrigation and soil and water conservation are paramount to the socio-economic development of rural areas in the Province. In Limpopo Province the total potential agricultural land is 10.55 million hectares of which 1.7 million ha is for crop production and 8.85 million ha is for grazing purposes. Of 1.7 million ha of potential cropland, 1.17 million ha is under commercial farming while 0.53 million is under communal farming. Of 8.85 million ha of potential grazing, 6 million ha is under commercial farming while 2.85 million is under communal farming. The total potential irrigation land in the province is, 137,000 ha.*

A very conservative estimate of agricultural production in the province reveals that it can easily produce over R13.26 Billion worth of Agricultural raw products per annum, of which R3.91 billion can be from rain fed agriculture, R8.22 billion from irrigation agriculture and R1.13 billion from stock farming" (Department of Agriculture, Limpopo Province Strategic Plan 2005/2006).

The Department of Agriculture, Limpopo Province Strategic Plan 2005/2006 states that two systems of agricultural land use have evolved as a result of past policies of the previous governments under the apartheid regime:

"*White farmers who practice large scale farming systems using the most advanced production technology occupy approximately 70% of the total land area. These commercial farmers operate large farms, which are well organized and situated on*

prime land. At present, there are approximately 5 000 commercial farming units in Limpopo Province.

The smallholder farms are located mostly in the former homeland areas and they cover approximately 30% of the provincial land surface area. Farming under the smallholder system is characterized by low levels of production technology and small size of farm holding of approximately 1.5 hectares per farmer; with production primarily for subsistence and little marketable surplus. It has been estimated that there were approximately 303 000 smallholder farmers in Limpopo Province by 2000. Women constitute 80% of these smallholder farmers. Given the fact that 89% of the population of Limpopo Province is classified as rural, agriculture plays a major role in the economic development of rural areas of the province." (Statistics South Africa: 2002).

The Department of Agriculture, Limpopo Province Strategic Plan 2005/2006 further states that the outcomes of Land reform and the acquisition of interests by Black entrepreneurs in agribusiness will over time remove the anomaly between the two systems of agricultural use:

"*The upliftment and support of primary and secondary agriculture is the goal of Department of Agriculture. The most limiting resource in the province is water. Irrigation is needed for about 137 000 hectares of which 58 000 hectares are in the hands of black small-scale farmers.*

There are 126 smallholder irrigation schemes in Limpopo Province with a total irrigable area of 19 460 ha. In addition some of the ARDC (Agriculture and Rural Development Corporation) schemes could well form part of Irrigation Schemes. There are about 45 schemes totalling 1 838 ha in this category. Most of these schemes, which were well constructed originally, have degraded infrastructure through lack of maintenance in recent years. The schemes were mostly government managed and maintained up to the mid 1990's, with the beneficiary farmers having little or no involvement in the day-to-day operation and maintenance of their scheme infrastructure.

The farmers are poorly trained, have no institutional structures through which to manage their schemes, have no financial resources for scheme maintenance and have extremely poor support services such as mechanisation services, production loan facilities and input supply facilities. Under these circumstances and combined with a very low self-esteem the productivity of the Province's smallholder schemes is extremely low. This situation, combined with high levels of poverty, results in a desperate need for support and assistance with the revitalisation of these schemes. However, any initiative to assist farmers with the revitalisation of their schemes must be focused first on 'people' development and empowerment and thereafter on the rehabilitation of infrastructure. The past focus on 'bricks and mortar' and not on the infrastructure use is largely the cause of widespread collapse of smallholder irrigation schemes throughout South Africa.

An integrated revitalization of Irrigation Schemes program has been initiated in the Department of Agriculture with a total budgetary estimate of R1.08 billion for a period of over 6 years. In this program which is farmers led and departmentally facilitated one, the following services are rendered to the existing irrigation schemes and their areas of influence within the neighbouring communities: Provision of bulk water supply to the Irrigation schemes; Provision of infield irrigation; Provision of access road to the schemes; Provision of rain water harvesting for rain-fed farmers; Provision of stock watering systems for the communities; Provision of dipping tank systems for the communities; Provision of training and capacity building for both irrigation and rain-fed farmers; Provision of institutional arrangements and structure in the form of Water Users Association or any; Other appropriate institutional structure in the irrigation schemes and training of their members; Provision of rain-fed farming support to the communities; Rendering of or facilitation for mechanization services on the other hand need to be normalized and supported within the emerging farming communities" (Department of Agriculture, Limpopo Province Strategic Plan 2005/2006).

The commercial farming sector has reached its full potential. Growth is dependent on improvements in technology. Agriculture in historically disadvantaged communities is largely confined to subsistence farming. Better utilization of State land (almost 40% of the land area of the Greater Tzaneen area of jurisdiction) holds the key to the

expansion/ growth of the agricultural sector and the economy. The under-utilized potential of 10 000 - 170 000 hectares referred to in the Phalaborwa SDI is State land (tribal land) and estates owned by the Province. Forward linkages to other sectors, especially manufacturing and trade, represent economic development potentials. The GTLM IDP states that "*Large areas of the GTLM area are taken up by land with high agricultural potential. It is imperative that this resource be protected for the economic well-being of the area. The dependence of the local economy on Agriculture, and the current location of high potential agricultural land in relation to existing development and service networks, ensures that this factor will also influence future development initiatives*" (Department of Agriculture, Limpopo Province Strategic Plan 2005/2006).

5.9.2 Spatial development

For the affected municipalities, the availability of land and the development of a beneficial spatial pattern is limited because of under-utilization of land by establishing limited business on large farm portions, providing extensive residential plots, overprovision of parks, inhibitive land cost (privately owned land) and statutory deterrents (state - owned land under tribal custodianship).

5.9.3 Road infrastructure

The study area is largely characterised by gravel roads, particularly within scattered villages. Most of these roads seem to be poorly maintained. Apart from these internal gravel roads, a fair tarred road network links most of the areas within the district. The R529 passes through the proposed dam basin. The transport plan for the area was not available at the time of writing this report.

5.9.4 Tourism

Whilst there appears to be some indication that the tourism sector has grown fairly considerably in the past five years, there appears to be general consensus that tourism demand is well below what would be expected from an area with such outstanding natural potential (MDM IDP). The tourism areas in the Province include: Tzaneen, Duiwelskloof, Ebenezer Dam, Eiland, George's Valley, Gravelotte, Haenertsburg, Hans Merensky, Letaba River, Letsitele, Leydsdorp, Murchison Range,

Ofcolaco, Phalaborwa, Sapekoe, Selati, Soekmekaar, The Downs (http://www.tzaneen.com/tourism/).

Nature/game Reserves in the area include: Wolkberg Wilderness Area, Lekgalameetse Nature Reserve, Karongwe, Makalali Game Reserve, Selati Nature Reserve, Ndzalama Nature Reserve, Hans Merensky Nature Reserve, Modjajdji Cycad Reserve, and the Kruger National Park. Cattle farming has largely been replaced by game farming.

6. LEGISLATION AND GUIDELINES CONSIDERED IN THE EIA

The Constitution of the Republic of South Africa Act (Act 108 of 1996) as amended by the Constitution of the Republic of South Africa Amendment Act (Act 35 of 1997) is the most important piece of national legislation, since it provides a framework within which all other laws of the country, including environmental law, must be formulated and interpreted.

The Bill of Rights is fundamental to the Constitution, and in Section 24 it is stated that 'Everyone has the right (a) to an environment that is not harmful to their health or well-being; and (b) to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that (i) prevent pollution and ecological degradation; (ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development'.

This Environmental Impact Assessment is being undertaken in compliance with the National Environmental Management Act (107 of 1998) (NEMA) (**Section 6.1**). Cognisance is also taken of other applicable legislation (**Section 6.2**) and international considerations (**Section 6.3**). The principles and guidelines emanating from the World Commission on Dams have also been noted (**Section 6.4**).

6.1 NATIONAL ENVIRONMENTAL MANAGEMENT ACT

The National Environmental Management (NEMA) Act (Act 107 of 1998) is a 'principles-based Act' that provides South Africa's overarching environmental legislation. This Act has as its primary objectives to provide for co-operative environmental governance by establishing principles for decision-making on matters affecting the environment, institutions that will promote co-operative governance, and procedures for co-ordinating environmental functions exercised by organs of state.

The Act provides for the right to an environment that is not harmful to the health and well-being of South African citizens; the equitable distribution of natural resources;

sustainable development; environmental protection; and the formulation of environmental management frameworks.

NEMA contains a set of principles that govern environmental management, and against which all environmental management plans and actions are measured. Sustainable development requires the consideration of all relevant factors including the following:

- Environmental management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental, cultural and social interests equitably.
- That pollution and degradation of the environment are avoided, or, where they cannot be altogether avoided, are minimised and remedied.
- That waste is avoided, or where it cannot be altogether avoided, minimised and reused or recycled where possible and otherwise disposed of in a responsible manner.
- That a risk averse and cautious approach is applied, which takes into account the limits of current knowledge about the consequences of decisions and actions.
- Responsibility for the environmental health and safety consequences of a policy, programme, project, product, process, service or activity exists throughout its life cycle.
- The participation of interested and affected parties in environmental governance must be promoted, and all people must have the opportunity to develop the understanding, skills and capacity necessary for achieving equitable and effective participation, and participation by vulnerable and disadvantaged persons must be ensured.
- Decisions must take into account the interests, needs and values of all interested and affected parties, and this includes recognising all forms of knowledge, including traditional and ordinary knowledge.

- Community well-being and empowerment must be promoted through environmental education, the raising of environmental awareness, the sharing of knowledge and experience and other appropriate means.

- The right of workers to refuse work that is harmful to human health or the environment and to be informed of dangers must be respected and protected.

- Decisions must be taken in an open and transparent manner, and access to information must be provided in accordance with the law.

- The vital role of women and youth in environmental management and development must be recognised and their full participation therein must be promoted.

The requirements for environmental authorisation are regulated by Government Notices 385, 386 and 387 of 21 April 2006, published in terms of Chapter 5 of NEMA.

Under these regulations the proposed development of Nwamitwa Dam and bulk water supply infrastructure contains activities that potentially have a detrimental effect on the environment in terms of the following items in GN 386 and 387 of 21 April 2006: These activities are presented in **Table. 6.1**.

Table 6.1: Activities listed in GN 386 and 387 that require authorisation from DEAT

Number and date of the relevant notice:	Activity No (s) (in terms of the relevant or notice) :	Describe each listed activity:
No. R 387 of 21 April 2006	1 (c)	The above ground storage of a dangerous good, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of 1000 cubic metres or more at any one location or site including the storage of one or more dangerous goods, in a tank farm.
No. R 387 of 21 April 2006	1 (e)	Any process or activity which requires a permit or license in terms of legislation governing the generation or release of emissions, pollution, effluent or waste and which is not identified in Government Notice No.

Number and date of the relevant notice:	Activity No (s) (in terms of the relevant or notice) :	Describe each listed activity:
		R. 386 of 2006.
No. R 387 of 21 April 2006	1 (p)	The treatment of effluent, wastewater or sewage with an annual throughput capacity of 15000 cubic metres or more.
No. 387 of April 2006	2	Any development activity, including associated structures and infrastructure, where the total area of the developed area is, or is intended to be, 20 hectares or more.
No. 387 of April 2006	5	The route determination of roads and design of associated physical infrastructure, including roads that have not yet been built for which routes have been determined before the publication of this notice and which has not been authorised by a competent authority in terms of the Environmental Impact Assessment Regulations, 2006 made under section 24(5) of the Act and published in Government Notice No. R.385 of 2006, where – it is a national road as defined in section 40 of the South African National Roads Agency Limited and National Roads Act, 1998 (Act No. 7 of 1998); it is a road administered by a provincial authority; the road reserve is wider than 30 metres; or The road will cater for more than one lane of traffic in both directions.
No. 387 of April 2006	6	The construction of a dam where the highest part of the dam wall, as measured from the outside toe of the wall to the highest part of the wall, is 5 metres or higher or where the high-water mark of the dam covers an area of 10 hectares or more.
No. 387 of April 2006	7	Reconnaissance, exploration, production and mining as provided for in the Mineral and Petroleum Resources Development Act 2002 (Act No. 28 of 2002), as amended in respect of such permits and rights.
No. 387 of April 2006	8	In relation to permits and rights granted in terms of 7 above, or any other right granted in terms of previous mineral legislation, the undertaking of any reconnaissance, exploration, production or mining related activity or operation within a exploration, production or mining area, as defined in terms of section 1 of the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002).

Number and date of the relevant notice:	Activity No (s) (in terms of the relevant or notice) :	Describe each listed activity:
No. 386 of April 2006	1 (k)	The bulk transportation of sewage and water, including storm water, in pipeline with – an internal diameter of 0.36 metres or more; or A peak throughput of 120 litres per second or more.
No. 386 of April 2006	1 (m)	Any purpose in the one in ten year flood line of a river or stream, or within 32 metres from the bank or a river or stream where the flood line is unknown, excluding purposes associated with existing residential use, but including – canals; channels; bridges; dams; and weirs
No. 386 of April 2006	1 (n)	The off-stream storage of water, including dams and reservoirs, with a capacity of 50 000 cubic metres or more, unless such storage falls within the ambit of the activity listed in item 6 of Government Notice No. R 387 of 2006.
No. 386 of April 2006	1 (o)	The recycling, reuse, handling, temporary storage or treatment of general waste with a throughput capacity of 20 cubic metres or more daily average measured over a period of 30 days, but less than 50 tons daily average measured over a period of 30 days.
No. 386 of April 2006	4	The dredging, excavation, infilling, removal or moving of soil, sand or rock exceeding 5 cubic metres from a river, tidal lagoon, tidal river, lake, in-stream dam, floodplain or wetland.
No. 386 of April 2006	7	The above ground storage of a dangerous good, including petrol, diesel, liquid petroleum gas or paraffin, in containers with a combined capacity of more than 30 cubic metres but less than 1000 cubic metres at any one location or site.
No. 386 of April 2006	8	Reconnaissance, prospecting, mining or retention operations as provided for in the Mineral and Petroleum Resources Development Act, 2002 (Act No. 28 of 2002), in respect of such permissions, rights,

Number and date of the relevant notice:	Activity No (s) (in terms of the relevant or notice) :	Describe each listed activity:
		permits and renewals thereof.
No. 386 of April 2006	15	The construction of a road that is wider than 4 metres or that has a reserve wider than 6 metres, excluding roads that fall within the ambit of another listed activity or which are access roads of less than 30 metres long.

Section 24(C) of NEMA, as amended, indicates that the Minister of the national Department of Environmental Affairs and Tourism (DEAT), or an organ of state with delegated powers, is the Competent Authority (CA) when, amongst others, the applicant is a national department. As the Department of Water Affairs and Forestry is a national department, this application was submitted to the DEAT, and not the Provincial department.

6.2 OTHER APPLICABLE LEGISLATION

6.2.1 Overview

A limited scoping of relevant legislation was undertaken in order to identify the key legal issues related to the proposed project. Applicable key environmental legislation, which must be considered by the DWAF during the implementation of the proposed project is summarised in **Table 6.2**.

Table 6.2: Summary of applicable legislation

Legislation	Sections	Relates to
The Constitution Act (No 108 of 1996)	Chapter 2	Bill of Rights
	Section 24	Environmental rights
	Section 25	Rights in property
	Section 32	Administrative justice
	Section 33	Access to information

Legislation	Sections	Relates to
National Environmental Management Act (No 107 of 1998) as amended	Section 2	Defines the strategic environmental management goals, principles and objectives of the government. Applies through-out the Republic to the actions of all organs of state that may significantly affect the environment
	Section 24	Provides for the prohibition, restriction and control of activities which are likely to have a detrimental effect on the environment.
	Section 28	The developer has a general duty to care for the environment and to institute such measures as may be needed to demonstrate such care
NEM: Protected Areas Act (No 57 of 2003)		The Act came into operation on 01 November 2004. The aim of the Act is to provide for the protection and conservation of ecologically viable areas representative of South Africa's biological diversity, natural landscapes and seascapes. In 2004, the National Environmental Management: Protected Areas Amendment Act 31 of 2004 was promulgated to amend Act 57 of 2003 with regard to the application of that Act to national parks and marine protected areas. The NEM: Protected Areas Amendment Act was published for public information on 11 February 2005 and came into operation on 01 November 2005. The NEM: Protected Areas Act, as amended by the NEM: Protected Areas Act 31 of 2004 repeals sections 16, 17 & 18 of the ECA as well as the National Parks Act with the exception of section 2(1) and Schedule 1.
The Conservation of Agricultural Resources Act (No 43 of 1983) and regulations	Section 6	Implementation of control measures for alien and invasive plant species
Natural Environmental Management: Air Quality Act		Dust control

Legislation	Sections	Relates to
(Act No. 39 of 2004) and regulations		Air pollution by fumes emitted by vehicles
National Environmental Management: Air Quality Act (No 39 of 2004)	Section 32	Control of dust
	Section 34	Control of Noise
	Section 35	Control of offensive odours
Occupational Health and Safety Act (No 85 of 1993) and regulations	Section 8	General duties of employers to their employees
	Section 9	General duties of employers and self employed persons to persons other than their employees
National Environmental Management: Biodiversity Act, 2004 (Act 10 of 2004) (NEMBA),		Strategy for achieving the objectives of the United Nation's Convention on Biological Diversity, to which South Africa is a signatory
	Sections 65-69	These sections deal with restricted activities involving alien species; restricted activities involving certain alien species totally prohibited; and duty of care relating to alien species
	Sections 71 and 73	These sections deal with restricted activities involving listed invasive species and duty of care relating to listed invasive species.
National Forests Act (No 84 of 1998) and regulations	Section 7	No person may cut, disturb, damage or destroy any indigenous, living tree in a natural forest, except in terms of a licence issued under section 7(4) or section 23; or an exemption from the provisions of this subsection published by the Minister in the

Legislation	Sections	Relates to
		Gazette.
	Sections 12-16	These sections deal with protected trees, with the Minister having the power to declare a particular tree, a particular group of trees, a particular woodland; or trees belonging to a particular species, to be a protected tree, group of trees, woodland or species. In terms of section 15, no person may cut, disturb, damage, destroy or remove any protected tree; or collect, remove, transport, export, purchase, sell, donate or in any other manner acquire or dispose of any protected tree, except under a licence granted by the Minister.
Fencing Act (No 31 of 1963)	Section 17	Any person erecting a boundary fence may clean any bush along the line of the fence up to 1.5 metres on each side thereof and remove any tree standing in the immediate line of the fence. However, this provision must be read in conjunction with the environmental legal provisions relevant to protection of flora.
National Water Act (No 36 of 1998) and regulations	Section 19	Prevention and remedying the effects of pollution.
	Section 20	Control of emergency incidents
All relevant Provincial Legislation and Municipal bylaws		
Water Services Act (Act 108 of 1997)		
Development Facilitation Act (Act 67 of 1995)	Section 42	relates to investigation and authorisation of non-statutory land development processes
	Section 44	relates to Land development on behalf of the State or local government body

Legislation	Sections	Relates to
National Heritage Resources Act (Act 25 of 1999)	Section 32	Relates to objects of cultural and historical significance
	Part 2	Relates to general protections of archaeological structures and burial grounds.
Promotion of Access to Information Act (Act 2 of 2000) as amended by the Promotion of Administrative Amendment Justice Act (Act 53 of 2002)		relates to creation of a culture of transparency and accountability
Promotion of Administrative Justice Act (Act 3 of 2000).	Section 5	Relate to the time period allowed for administrative action whose right are materially or adversely affected by the administrative action
	Section 9	Relates to the variations of the time periods for judicial review.
	Section 10	Relates to procedures for public enquiries
Expropriation Act (Act 63 of 1975)	Section 2	Relates to the power of the relevant minister to expropriate property for public and certain other purposes.
	Section 7	Relates to the relevant ministers' decision to expropriate land and appropriate notice being given to landowners.
Mineral and Petroleum Resources Development Act (Act 28 of 2002)	Sections 39 & 106	Relates to sourcing material for construction."
Limpopo Environmental Management Act (Act no 7 of 2003)		The Act refers to the management and protection of the environment in the Limpopo Province, to secure ecologically sustainable development and responsible use of natural resources in the province is applied and interpreted in accordance with NEMA and relates to the listing of protected species and management thereof..

6.2.2 Authorisation of borrow areas

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 government water works for improving the safety of that government water 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, which 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 (EMProgramme) for approval in terms of Section 39 (4) of the Act, and the EMProgramme is submitted for approval and that DWAF is not an applicant.

A Memorandum of Understanding has also been compiled between the Department of Water Affairs and Forestry and the Department of Minerals and Energy concerning the financial provision associated with rehabilitation of quarries and borrow areas used for the construction or maintenance of dams or any other water resource infrastructure . Where approval is sought for an environmental management programme for quarries or borrow area outside the footprint of a government water works, a copy of this Memorandum of Understanding should be included in the submission with confirmation that the cost of rehabilitating such quarry or borrow area

is included in the approved budget for the construction works associated with the dam safety rehabilitation programme activities of the dam in question.

6.2.3 The Reserve

In accordance with the National Water Act, the Reserve is that portion of water required to meet basic human needs, and the needs of the aquatic ecosystem. The Department of Water Affairs and Forestry undertook a preliminary Reserve determination for the Groot Letaba River in 2006, and the resulting requirements will be taken into account in both the yield analysis and technical design of the project.

6.3 INTERNATIONAL CONSIDERATIONS

The DWAF is required to continuously liaise with the country's neighbours, specifically Mozambique, during the planning and implementation of the GLeWaP in line with international protocols and agreements. Under consideration is the potential impact on Mozambique of the GLeWaP.

The EIA needs to take note of the associated responsibilities linked to the Revised SADC Protocol on Shared Watercourse Systems and the new SADC Water Policy that will shortly be signed and ratified by SADC countries.

6.4 WORLD COMMISSION ON DAMS

The final report of the World Commission on Dams (WCD) was published in November 2000. The objectives of this Commission were to review the effectiveness of large dams and develop internationally acceptable principles, strategic priorities and criteria and guidelines for application in projects aimed at providing water supplies to meet the needs of society. The Commission, now disbanded, held no legal authority and each nation is responsible for implementing the recommendations on its own accord.

Key findings of the WCD are as follows:

- Dams have made an important and significant contribution to human development and the benefits derived from them have been considerable.

- However, in many cases, an unacceptable and often unnecessary price has been paid to secure those benefits, especially in social and environmental terms, by people displaced, by communities located downstream from a new dam, by taxpayers, and by the natural environment.

- A lack of equity in the distribution of benefits has called into question the value of many dams in meeting water and energy development needs, when compared to alternatives.

- By bringing to the table all those whose rights are involved and who bear the risks associated with different options for water and energy resources development, the conditions for a positive resolution of competing interests and conflicts are created.

- Negotiating outcomes will greatly improve the development effectiveness of water and energy projects by eliminating unfavourable projects at an early stage, and by offering, as a choice, only those options that key stakeholders agree represent the best ones to meet the needs in question.

  The WCD identified seven strategic priorities, supported by policy principles, to provide a principled and practical way forward for decision-making. These strategic priorities have been included within the assessment framework for this proposed project and are summarized as follows:

- Gaining public acceptance.

  Public acceptance of key decisions is essential for equitable and sustainable water and energy resources development. This requires the use of decision-making processes and mechanisms that enable informed participation by all groups of people, and result in the demonstrable acceptance of key decisions. With regard to the GLeWaP, various parallel means of communication and participation have been implemented.

- Comprehensive options assessment.

  Alternatives to dams often exist. To explore these alternatives, the needs for water, food and energy must be assessed and objectives clearly defined. The appropriate development response must be identified from a range of options. These options are based on comprehensive and participatory assessment of the full range of policy, institutional and technical aspects. In the assessment process, social and environmental aspects must have the same significance as economic and financial factors. The options assessment process should continue through all stages of planning, project development and operations.

- Addressing existing dams.

  Opportunities exist to optimise the benefits from many existing dams and these must be considered. Dams and the context in which they operate are not static over time. Changes in water use priorities, physical and land use changes in the river basin, technological developments, and changes in public policy expressed in environmental, safety, economic, and technical regulations may transform benefits and impacts.

- Sustaining rivers and livelihoods.

  Rivers, watersheds and aquatic ecosystems are the biological 'engines' of the planet. They are the basis for life and the livelihoods of local communities. Dams transform landscapes and create risks of irreversible impacts. Understanding, protecting and restoring ecosystems at river basin level are essential to foster equitable human development and the welfare of all species. Options assessment and decision-making around river development must prioritise the avoidance of impacts, followed by the minimisation and mitigation of harm to the health and integrity of the river system. These aspects are well-known and form part of the issues raised during Scoping. The manner in which they will be addressed, and negative impacts mitigated, form part of the Impact Assessment, inclusive of Specialist Studies, that will follow Scoping.

- Recognising entitlements and sharing benefits.

Joint negotiations with adversely affected people result in mutually agreed and legally enforceable mitigation and development provisions. Affected people are beneficiaries of the project. Successful mitigation, resettlement and development are fundamental commitments and responsibilities of the State and the developer. They bear the onus to satisfy all affected people moving from their current context and resources.

- Ensuring compliance.

  Ensuring public trust and confidence requires that the governments, developers, regulators and operators meet all commitments made for the planning, implementation and operation of dams. Regulatory and compliance frameworks need to use incentives and sanctions to ensure effectiveness where flexibility is needed to accommodate changing circumstances.

- Sharing rivers for peace, development and security.

  Storage and diversion of water on transboundary rivers has been a source of considerable tension between countries and even within countries. The use and management of such shared resources must increasingly become the subject of mutual self-interest for regional co-operation and peaceful collaboration. This leads to a shift in focus from the narrow approach of allocating a finite resource, to the sharing of rivers and their associated benefits in which States can become innovative in defining the scope of issues for discussion.

6.5 NON-REGULATORY ACTIVITIES

Within the configuration of the GLeWaP, there are a number of activities that are being undertaken but which do not require environmental authorisation by the Department of Environmental Affairs and Tourism. These activities are being addressed by the Department of Water Affairs and Forestry to demonstrate best practice and to align the GLeWaP with the strategic priorities arising from the WCD. Non-regulatory activities that are currently being undertaken include:

- Water conservation and demand management assessments.

- A Regional economic/macro-economic assessment.
- International protocols and agreements.
- Provision of the Reserve for the Groot Letaba River.

These studies will be undertaken as part of the wider GLeWaP and their results and findings will be fed back into the EIA, notably, the Environmental Impact Report that will be drafted following the completion of Specialist Studies that form part of the Impact Assessment Phase of the EIA.

7. PUBLIC PARTICIPATION IN THE SCOPING PHASE

7.1 INTRODUCTION

Public participation is an essential and legislative requirement for environmental authorisation. The principles that necessitate communication with society at large are best embodied in the principles of the National Environmental Management Act (Act 107 of 1998, **Chapter 1**), South Africa's overarching environmental law. In addition, the Generic Public Participation Guidelines 2001 of the Department of Water Affairs and Forestry contain further guidelines for public participation.

The public participation process for the Groot Letaba River Water Development Project (GLeWaP) has been designed to satisfy the requirements laid down in the above legislation and guidelines. **Figure 7.1** provides an overview of the EIA technical and public participation processes, and shows how issues and concerns raised by the public are used to inform the technical investigations of the EIA at various milestones during the process. This section of the report highlights the key elements of the public participation process to date.

7.2 OBJECTIVES OF PUBLIC PARTICIPATION IN THE EIA

The objectives of public participation in an EIA are to provide sufficient and accessible information to I&APs in an objective manner to assist them to:

- During Scoping:
- Identify issues of concern, and provide suggestions for enhanced benefits and alternatives.
- Contribute local knowledge and experience.
- Verify that their issues have been considered.

During the Impact Assessment:

- Verify that their issues have been considered either by the EIA Specialist Studies, or elsewhere.
- Comment on the findings of the EIA, including the measures that have been proposed to enhance positive impacts and reduce or avoid negative ones.

The key objective of public participation during Scoping is to help define the scope of the technical studies to be undertaken during the Impact Assessment.

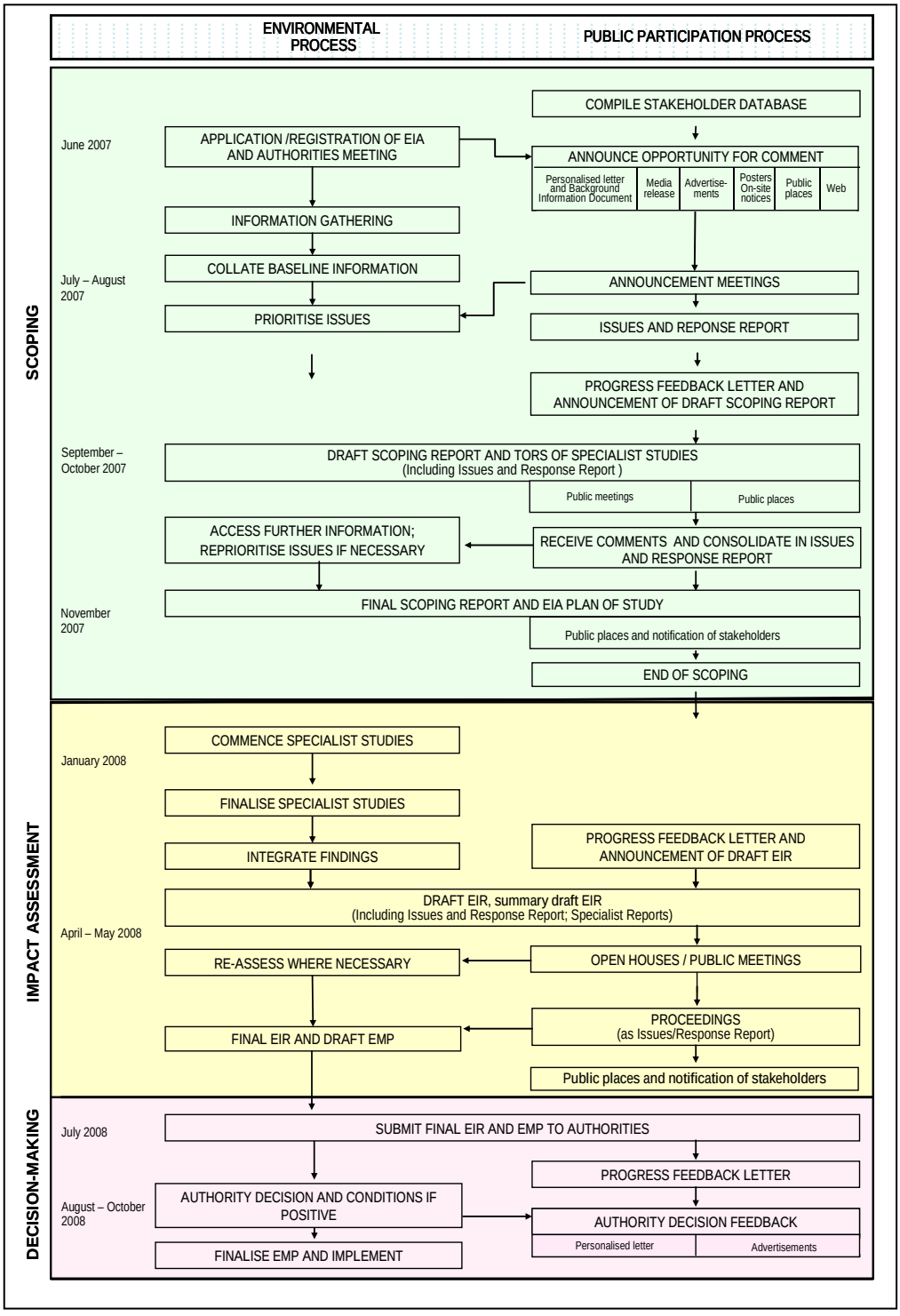


Figure 7.1: Technical and public participation process and activities that comprise the Environmental Impact Assessment for the Groot Letaba River Water Development Project

7.3 IDENTIFICATION OF INTERESTED AND AFFECTED PARTIES

The direct mailing list for this EIA consists of almost 1 350 individuals and organisations from both within the project area and beyond its boundaries (**Appendix B**). These include all those I&APs that expressed an interest during the Announcement Phase of the project between July and August 2007. **Table 7.1** shows that these I&APs represent a broad spectrum of sectors of society. Consultation has taken place with representatives of different sectors of society, rather than with every individual in the project area. Nevertheless, special efforts were made to obtain the contributions of all people who may be affected directly by the proposed project.

Table 7.1: Sectors of society represented by I&APs on the direct mailing list

❑ National government ❑ Provincial government (Limpopo) ❑ Local government (district as well as local municipalities) ❑ Organised agriculture ❑ Business/Commerce ❑ Environmental and conservation organisations ❑ Health ❑ Industry ❑ Education: local schools and universities	❑ Local landowners (In the dam basin area) ❑ Local communities, including tribal authorities, women's groups, development committees and other community based organisations (CBOs) in the project area ❑ Media (print and broadcast) ❑ Labour unions ❑ Water organisations (Irrigation Boards, Water Boards, Water Committees, and Water User Associations)	❑ Non Government Organisations (NGOs) ❑ Ratepayers Associations ❑ Researchers and consultants ❑ Tourism ❑ Transport

7.4 ANNOUNCEMENT OF OPPORTUNITY TO BECOME INVOLVED

The opportunity to participate in the EIA was announced in July and early August 2007 in four languages (English, XiTsonga, Sepedi and Afrikaans) as follows:

- Telephonic notification to the directly affected landowners on the farms directly affected by the proposed dam.
- Five meetings with stakeholders in the project area. See details below in **Table** 7.2.

- Distribution of a letter of invitation to become involved, addressed to individuals and organisations by name, accompanied by a Background Information Document containing details of the proposed project including maps of the project area and the dam site, and a registration sheet (**Table 7.3** and **Appendix D**).

- Leaving the Background Information Document (**Appendix D**) at public places in the study area (**Table 7.4**).

- Advertisements (**Appendix D**) in the media (**Table 5.7**).

Plate 7.1: Example of advertisement

- Project notice boards at the following localities along roads in the project area:

  - Tzaneen Dam;

Plate 7.2: Notice at the Tzaneen Dam

- At the Tarentaal Friendly Grocer shop and service station on the R71 on route to the proposed dam site;

- At the crossing with the R71 and the road from Taganashoek – on route to the proposed dam site;

- At the crossing with the R71 and the road towards/from Giyani (R529);

- At the Caltex Service Station, close to The Junction at the Letaba River;

- At the crossing with the R71 and the road towards/from Letsitele/Lyndenburg (R529);

- Close to the proposed dam site on the road reserve at the Gubitz Farm (Delhi);and

Plate 7.3: Notice board on the road reserve at the Gubitz Farm

- Close to the proposed dam site on the road reserve at the farm La Gratitude.

- All documentation published on the project web site - (www.dwaf.gov.za/projects/GrootLetaba)

Table 7.2: List of meetings held during the announcement of the EIA

Date	Venue	Time	Attended by:
Monday, 30 July 2007	Mopani District Municipality, Banquet Hall, Giyani	09:00 – 15:00 .	Key stakeholders and authorities
Tuesday, 31 July 2007	Fair View Country Lodge, Tzaneen	09:00 – 13:00	Key stakeholder and authorities
Tuesday, 31 July 2007	Groot Letaba Water User Association's offices, Tzaneen	14:00 – 16:00	Members of the Groot Letaba Water User Association's management board, representatives of irrigation boards and major water users
Wednesday, 1 August 2007	Tribal Council offices, Nwamitwa	09:00 – 13:00	Nwamitwa community, Ward Councillors, Chief Valoyi. Hosi Nwamitwa

Wednesday, 1 August 2007	The Letaba Junction, Letsitele	14:00 – 16:00	Directly affected land owners in the dam basin area

Table 7.3: Project announcement distribution data

Distribution	English	Afrikaans	Sepedi and Xonga
By mail, leaving in public places and leaving with stakeholders during meetings			
Almost 1 350 stakeholders on direct mailing list.	800	200	350
Nine newspapers and three radio stations.	20	20	20
Public places (e.g. libraries, post offices, office receptions of stakeholder organisations, etc).	150	50	80
During meetings as mentioned in Table 7.2	400	200	300
Department of Water Affairs and Forestry project and study teams and Limpopo Regional Office	100	100	150

Table 7.4: Public places where BIDs were available

Town/area/district	Locality	Contact person	Telephone
Giyani	Mopani District Municipality	Mr Timothy Maake Municipal Manager	(015) 811 6300
Giyani	Great North Farmers	Mr PM Mathe President and member	(015) 812 2913
Tzaneen	Greater Tzaneen Municipality	Mr Mabakane Mangena Municipal Manager	(015) 307 8000
Modjadjiskloof	Greater Letaba Municipality	Mr IP Mutshinyali Municipal Manager	(015) 309 9246
Giyani	Greater Giyani Municipality	Mr Silence Makhubele Municipal Manager	(015) 811 5500/44
Phalaborwa	BaPhalaborwa Municipality	Office of the Municipal Manager	(015) 780 6301

Table 7.5: Advertisements to announce opportunity to contribute to the EIA

Advertisements/announcements	Date published/announced
Newspapers	
Bulletin	20 July 2007
Ekasi bulletin	20 July 2007
Letaba Herald	19 July 2007
Seipone	18 July 2007
Agri Spectrum	25 July 2007
Northern Review	19 July 2007
Capricorn Voice	18 July 2007
Mopani News	19 July 2007
Polokwane Observer	19 July 2007
* Several newspapers such as the Daily Sun, Letaba Herald and others published information about the proposed project.	
Radio Stations	
Munghana Lonene FM, Polokwane	During the week of Monday 16 July - 20 July 2007
Thobela FM, Polokwane	During the week of Monday 16 July - 20 July 2007
Greater Lebowakgomo	During the week of Monday 16 July - 20 July 2007
Radio Sekgosese	During the week of Monday 16 July - 20 July 2007
Radio Univen	During the week of Monday 16 July - 20 July 2007
* Several other radio stations such as Jacaranda, RSG, Radio Botlokwa also announced information about the project	

7.4.1 Parallel stakeholder liaison by the Department of Water Affairs and Forestry

In addition to the public participation process for the EIA, the Department of Water Affairs and Forestry has initiated several parallel stakeholder liaison initiatives for the project as a whole. Issues relevant to the EIA identified during these initiatives are incorporated into the process on an ongoing basis.

Table 7.6 lists the Department's formal liaison structures for this project, their purpose and representivity. **Table 7.7** lists additional Departmental liaison activities.

Table 7.6: Department of Water Affairs and Forestry formal liaison structures established for the Groot Letaba River Water Development Project.

Liaison Structure	Purpose	Representivity
Project Steering Committee (Meetings already took place on 29 March and 29 August 2007)	Guidance pertaining to strategic issues related to the project, including international matters	▪ Department of Water Affairs and Forestry and other relevant national departments (DEAT, Treasury) ▪ Limpopo Government ▪ Municipalities in the project area ▪ Key sectors such as conservation
International Liaison Strategy Committee	Liaison with neighbouring states	Department of Water Affairs and Forestry – specifically members that liaise with the Limpopo Basin Permanent Technical Committee
Institutional and Finance Strategy Committee	Strategic guidance relating to the development of institutional arrangements and financing matters	Department of Water Affairs and Forestry: Directorates
Project Management and Co-ordination Team	To co-ordinate and synchronize all the activities, to ensure efficient communication and to manage components and phases of the project	Department of Water Affairs and Forestry: Options Analysis and other nominated members

Table 7.7: Departmental stakeholder liaison outside formal structures

Sector/Organisation	Purpose	Activity
Various National, Provincial and Local Government Authorities	To promote cooperative governance by providing them with project information, obtain their comment and support	Written invitations by Director General, presentation at various occasions (May, August 2007, etc)
Local authorities	To be informed of water requirements; to reach agreement on off-take points	Various meetings
National and Provincial Roads Authorities	To deliberate road realignments and diversions, and new road infrastructure	Various meetings
Eskom	To discuss electricity requirements and supply	Various meetings
Department of Environmental Affairs and Tourism	To discuss the Environmental Impact Assessment	Various meetings

7.5 DRAFT SCOPING REPORT PUBLIC COMMENT PERIOD

7.5.1 Draft Scoping Report

The purpose of the Draft Scoping Report (DSR) was to enable I&APs to verify that their contributions have been captured, understood and correctly interpreted. The issues identified by the I&APs and by the environmental technical specialists, have been used to define the Terms of Reference for the Specialist Studies that will be conducted during the Impact Assessment Phase of the EIA. A period of four weeks was available for public review of the Draft Scoping Report (from Wednesday, 3 October – Wednesday 31 October 2007).

In addition, a Summary of the DSR was compiled and translated into Afrikaans, XiTsonga and Sepedi, and proactively mailed to all key stakeholders as well as those who requested copies.

In addition to media advertisements that announced the opportunity to participate in the EIA, the opportunity for public review was announced as follows:

- In the Background Information Document (**Appendix D**).

- At various meetings (as outlined previously).
- In a letter sent out in September 2007 (**Appendix D**), and addressed personally to almost 1 350 individuals and organisations. The letter included a reply sheet for stakeholders to request their own copies of the report, and to register for one of the two public meetings that were held on 12 and 13 October 2007.
- Radio announcements on regional radio stations.
- Telephone calls to key stakeholder organisations.

The Draft Scoping Report, including the Issues and Response Report, and its Summary (in Afrikaans, XiTsonga and Sepedi) was distributed for comment as follows:

- Left in public places throughout the project area and beyond (**Table 7.8**).
- Mailed to key stakeholders.
- Mailed to I&APs who requested the report.
- Distributed at the public meetings (Section 6.1).
- Posted on the Department of Water Affairs and Forestry's web site.

I&APs had the opportunity to comment on the report in various ways, such as completing the comment sheet that accompanied the report, submitting individual comments in writing or by email, attending public meetings and one-on-one discussions with members of the EIA team during the meetings.

7.5.2 Review of the Draft Scoping Report

Public meetings (12 October 2007 in Tzaneen and 13 October 2007 in Nwamitwa) were held to assist I&APs to comment on the Draft Scoping Report and to raise additional issues that may be considered necessary. The content of the report was presented verbally during the meetings. Each meeting also had a visual component to stimulate small-group discussions with members of the EIA team in the language of choice of I&APs. **Table 7.8** lists these meetings, their times and venues.

Consolidated proceedings of the two meetings will be distributed to everyone who attended with a request to verify that their contributions were recorded correctly. A copy of the minutes is attached to this report as part of **Appendix D.**

Table 7.8: List of public places in the project area and beyond where Background Information Documents and the Draft Scoping Report were lodged for public review

Town/area/district	Locality	Contact person	Telephone
Mokwakwaela area, Letaba	1.1.1.a.1 Mokwakwaela Multi Purpose Community Centre	Mr Shilubane	082-453 3774
Sekgosese area, Duiwelskloof, Letaba	Sekgosese Multi Purpose Community Centre	Mr MC Tshamamo	083 289 7955
Modjadjiskloof area, Letaba	Greater Letaba Local Municipality	Mrs H Kruger	(015) 309-9246/7
Letaba region	Department of Water Affairs and Forestry	Ms Morongwa Mbhalati	(076) 931 6177
Tzaneen area, City Centre	Greater Tzaneen Local Municipality Agatha Street, Civic Centre, Tzaneen	HOD: Public Participation: Mr Moroka Molale HOD Communication: Mr ZS Mkhatshwa	(015) 307 8000
Shilubane village, Tzaneen	Vula Mehlo Multi Purpose Community-Thusong Centre	HOD: Public Participation: Mr Moroka Molale HOD Communication: Mr ZS Mkhatshwa	(015) 307 8000
Tzaneen	Tzaneen Public Library	HOD: Public Participation: Mr Moroka Molale HOD Communication: Mr ZS Mkhatshwa	(015) 307 8000
Letsitele area	Letsitele Public Library	HOD Public Participation: Mr Moroka Molale HOD Communication: Mr ZS Mkhatshwa	(015) 307 8000
Haenertzburg	Haenertzburg Public Library, Mare Street, Community Centre	Ms Minnie de Villiers	(015) 276 4707
Tzaneen area, Letsitele	Agri Letaba	Mr Louis van Rooyen	(015) 345 1817
Tzaneen	Groot Letaba Water Users Association Offices	Mr Jurg Venter	(015) 307 2651
Tzaneen	Department of Water Affairs and Forestry	Mr Jakkie Venter/ Mr Isaac Nyatlo	(015) 307 3627/ 8600
Khopo village, Tzaneen	Lesedi Thusong Centre	HOD: Public Participation: Mr Moroka Molale HOD Communication: Mr ZS Mkhatshwa	(015) 307 8000
Xihoko village, Tzaneen	Xihoko Multi Purpose Community Centre	HOD: Public Participation: Mr Moroka Molale HOD Communication: Mr ZS Mkhatshwa	(015) 307 8000
Nwamitwa village, Tzaneen	Valoyi Traditional office	HOD: Public	(015) 307 8000

Town/area/district	Locality	Contact person	Telephone
		Participation: Mr Moroka Molale HOD Communication: Mr ZS Mkhatshwa	
Nwamitwa village, Tzaneen	Nwamitwa Traditional office	HOD: Public Participation: Mr Moroka Molale HOD Communication: Mr ZS Mkhatshwa	(015) 307 8000
Nkowankowa, Tzaneen	Nkowankowa Multi Purpose Community Centre, Nkowankowa	HOD: Public Participation: Mr Moroka Molale HOD Communication: Mr ZS Mkhatshwa	(015) 307 8000
Relela village, Tzaneen	Relela Multi Purpose Community Thusong Centre	HOD: Public Participation: Mr Moroka Molale HOD Communication: Mr ZS Mkhatshwa	(015) 307 8000
Dzumeri village, Giyani	Dzumeri Community Centre	Office of the Municipal Manager	(015) 812 5233
Giyani	Greater Giyani Local Municipality	Office of the Municipal Manager	(015) 812 5233
Giyani, Mopani District	Mopani District Municipality	Office of the Municipal Manager	(015) 811 5500
Giyani, Mopani District	Department of Water Affairs and Forestry	Mrs Matsie Molapisane	(015) 812 0090
Phalaborwa	Ba-Phalaborwa Local Municipality	Ms Riana Smit	(015) 780 6302
Namakgale, Phalaborwa	Namakgale Police Station Calvin Ngobeni Street, opposite Sediba Accommodation and next to magistrate offices	Station Commissioner	(015) 769 1530
Polokwane	Department of Water Affairs and Forestry	Ms Sarah Mamabolo/ Mrs Leah Matlala	(015) 290 1444
Mokwakwaela area, Letaba	Mokwakwaela Multi Purpose Community Centre	Mr Shilubane	082-453 3774
Sekgosese area, Duiwelskloof, Letaba	Sekgosese Multi Purpose Community Centre	Mr MC Tshamamo	083 289 7955
Modjadjiskloof area, Letaba	Greater Letaba Local Municipality	Mrs H Kruger	(015) 309-9246/7
Letaba region	Department of Water Affairs and Forestry	Ms Morongwa Mbhalati	(076) 931 6177

7.5.3 Obtaining comment and contributions

The following opportunities were available during Scoping for I&APs to contribute comment:

- Completing and returning registration sheets on which space was provided for comment.
- Providing comment telephonically or by email to the public participation office.
- Two public meetings with stakeholders in the project area (**Table 7.9**).

Table 7.9: Public meetings to comment on the Draft Scoping Report

Date	Venue	Time
Friday, 12 October 2007	Tzaneen Lodge	08:30 – 13:00
Saturday, 13 October 2007	Runnymede Thusong Centre, Nwamitwa Village	08:30 – 13:00

7.5.4 Final Scoping Report

The Final Scoping Report was prepared after the public comment period closed on 31 October 2007. It was updated with any additional issues raised by I&APs and new information that was generated as a result of this process. It is to be distributed to the Authorities and key I&APs, and to those individuals who specifically request a copy. I&APs will be notified of the availability of the report (see example of the letter as part of **Appendix D**).

Once the lead authority for the EIA has approved the Final Scoping Report, the Impact Assessment Phase of the EIA will commence.

7.6 ISSUES AND RESPONSE REPORT AND ACKNOWLEDGEMENTS

Issues raised thus far, including issues raised during the Announcement and Scoping Phase, are captured in an Issues and Response Report (Version2), appended to this DSR (**Appendix C**). This report was updated to include the additional I&AP contributions that were made based on the information presented in the Draft Scoping Report and at the public meetings held on 12 and 13 October 2007.

The contributions made by I&APs are acknowledged in writing.

8. DESCRIPTION OF ENVIRONMENTAL ISSUES AND POTENTIAL IMPACTS

The proposed infrastructure components of the GLeWaP project are likely to result in impacts on the:

- quantity and quality of river flows (**Chapter 8.1**);
- terrestrial ecology (**Chapter 8.2**);
- social processes (**Chapter 8.3**);
- economic processes (**Chapter 8.4**);
- physical infrastructure (**Chapter 8.5**);
- public health (**Chapter 8.6**); and
- heritage resources (**Chapter 8.7**).

Specific impacts related to construction activities must also be considered (**Chapter 8.8**). Other impacts considered are mentioned in **Chapter 8.9**).

8.1 QUANTITY AND QUALITY OF RIVER FLOWS

8.1.1 Key Issues related to river flows

One of the objectives of the project is to make it possible to improve the management of water resources so as to stop degradation of the conservation status of the riverine ecosystem downstream of the dam. This will result in a positive impact on the ecological status of the river. However, if not implemented correctly a change in the flow and mean annual run-off (MAR) in the downstream Groot Letaba River could result in:

- The degradation of downstream habitat in the Groot Letaba River (both in-stream and riparian). Floods are needed to scour the banks, maintain channels, recharge riverbanks for riparian vegetation growth, to distribute seeds, etc;
- Altered biotic stimuli (i.e. floods induce spawning in certain fish species); and
- Changes in the composition and diversity of aquatic fauna and riparian vegetation.

The dam could create a suitable habitat for aquatic weeds, algae blooms and exotic fish species. The newly created dam basin habitat could also cause an ideal habitat for Bilharzia and malaria vectors.

The proposed dam is situated on the confluence of the Nwanedzi River and Groot Letaba River. No fish or aquatic macro-invertebrate data exist for the Nwanedzi River and not much is known about the extent to which fish in the Groot Letaba River is influenced by this ephemeral tributary, or regarding the interaction between the occurrence of aquatic macro-invertebrates in this tributary and the Groot Letaba River. Inundation of well established riparian vegetation on the southern bank of the Nwanedzi River was also indicated as a concern.

The proposed dam will form a barrier that will further prevent fish migration in the Groot Letaba River and this will result in the further reduction of the genetic stability of the fish population in the long-term. Fish movement/migration from the Groot Letaba River upstream into the Nwanedzi River will also be prevented.

Areas downstream of the proposed dam still have good riparian vegetation, especially the areas in the Hans Merensky Nature Resort, Letaba Ranch and the KNP. Lowering of the conservation status of the Groot Letaba River in the downstream conservation areas, especially the KNP, is a concern.

8.1.2 Reserve Determination

The overexploitation of the Letaba River and the subsequent need for compulsory licences in order to achieve adequate resource protection, led to the Letaba

Catchment Reserve Determination Study (DWAF, 2006). The overall objective of this study was to provide a sufficient range of Ecological Water Requirements (EWR) scenarios to allow for an ecological Reserve for the various reaches of the Letaba River and its main tributaries within South Africa.

In the Reserve Determination Study the Letaba River Catchment was delineated into nine Resource Units (RU), each unit being geographically and ecologically homogenous. Not all of these RU's could however be catered for during the Reserve study, either because the characteristics of the river within the RU did not meet the criteria for an EWR site or as a result of budget limitations. Seven EWR sites were selected within these RUs and represent a critical site within the relevant river section. These sites were selected with the objective to maximize the opportunities for accurately determining a Comprehensive Reserve for the Letaba River:

- EWR1: Groot Letaba River upstream of Tzaneen Dam (Appel). This site is located between Ebenezer and Tzaneen Dam.
- EWR2: Letsitele River (Letsitele Tank)
- EWR3: Groot Letaba River (Hans Merensky). This site is located downstream of the Tzaneen Dam and upstream of the Molototsi River confluence, about 7km upstream of Prieska Weir.
- EWR4: Groot Letaba River upstream of KNP (Letaba Ranch). This site is situated downstream of the Molototsi River and upstream of the confluence with the Klein Letaba River.
- EWR5: Klein Letaba River, downstream of the confluence of the Middle Letaba River and Middle Letaba Dam
- EWR6: Groot Letaba River in KNP (Lonely Bull). This site is situated downstream of the confluence with the Klein Letaba River.
- EWR7: Groot Letaba River in KNP (Letaba Bridge), downstream of EWR6.

Site EWR3 is situated closest to the proposed dam site, downstream from Tzaneen Dam. Data gathered at this site will therefore serve as baseline for the aquatic ecological assessment to be conducted for the GLeWaP study. Data from site EWR3, EWR4, EWR6 and EWR7 will be crucial in the development of a release strategy for the proposed dam. The latter two sites are situated in the KNP and results from these two sites are driving the system.

Present Ecological State (PES) for each Resource Unit of the main ecological drivers (hydrology, geomorphology and water quality) and ecological responses (riparian vegetation, aquatic macro-invertebrates and fish) were determined and integrated into an overall EcoStatus. Ecological Categories and alternative categories were recommended based on the results of the PES and are summarized in **Table 8.1**.

Table 8.1: The EcoClassification results for the PES of each component per EWR site (from DWAF, 2006)

	EWR1	EWR1	EWR3	EWR4	EWR5	EWR6	EWR7
Hydrology	C	C	D	D	C/D	D	D
Physico-chemical	B	C/D	C	B/C	B	C	C
Geomorphology	C	D/E	C	C/D	C	C	C
Fish	C	C	C	C	B	C	C
Invertebrates	C/D	D	D	D	C	D	D
Riparian Vegetation	C	D/E	D	D	B	C	C
EcoStatus	C	D	C/D	C/D	C	C	C

The above Ecological Categories (EC) is the primary EcoSpecs, and maintenance of these EcoSpecs will form the basis for the Impact Assessment for the proposed dam.

Table 8.2: Present Ecological State (PES), Ecological Importance and Sensitivity (EIS), Socio-cultural Importance (SI) and

Recommended Ecological Class (REC) for each EWR site (from DWAF, 2006)

	PES	IMPORTANCE		REC
		EIS	SI	
EWR1	C	Mod	Low	C
EWR2	D	Mod	Low	D
EWR3	C/D	High	Mod	C/D
EWR4	C/D	High	High	C/D
EWR5	C	Mod	Mod	C
EWR6	C	High	Low	C
EWR7	C	High	Low	C

One of the objectives of the Reserve study was to recommend and motivate specific low and high flows for maintaining ecological conditions within a specific Ecological Category. The methods followed were the Habitat Flow Stressor Responses for low flows and a combination of the Building Block Methodology (BBM) and DRIFT method for the high flows. The results are summarized in **Table 8.3**.

Table 8.3: Instream Flow Requirements for EWR sites in the Letaba River expressed as a percentage of the natural Mean Annual Run-off (MAR) for the recommended Ecological Categories (EC)

	EWR1	EWR2	EWR3	EWR4	EWR5	EWR6	EWR7
REC	C	D	C/D	C/D	C	C	C
Maintenance low flows (%)	10.47	32.06	1.29	2.82	8.48	2.17	3.23
Drought low flows (%)	15.76	4.32	0.23	0.44	0.30	0.93	0.09
High flows (%)	15.76	11.11	11.78	15.84	24.27	7.86	7.65
Long-term mean of MAR (%)	27.56	38.78	14.15	20.76	24.27	10.74	11.26

Various operational flow scenarios were developed for each EWR site and their ecological and social-economic consequences described. Seven different scenarios were evaluated for each EWR site in terms of its impact on the ecology, system, yield, goods & services, and overall economic activities. An optimised scenario was devised that would have the least overall impact on the users and the ecology (**Table 8.4**). The flow regime associated with the selected scenario provides the best balance between ecological sustainability and social and economic development. This scenario was accepted and approved by DWAF at a meeting in September 2005 (DWAF, 2006)

Table 8.4: Selected operational flow scenario summarized as a percentage of the MAR

	Annual EWR (million m3)	Virgin MAR (million m3)	Annual EWR (% nMAR)
EWR1	19.75	71.27	27.71
EWR2	31.756	86.06	36.90
EWR3	42.448	364.49	11.65
EWR4	69.87	402.26	17.37
EWR5	17.054	95.01	17.95
EWR6	47.0317	546.59	8.60
EWR7	51.52	561.67	9.17

The Reserve study (DWAF, 2006) also included an assessment of the practicality of improving ecological conditions. This is specifically important in view of the fact that KNP officials requested an improved PES within the KNP, in line with their mandate to improve biodiversity within the park. Based on available information, the improvement of the PES within the KNP (from PES of C to a REC of B) is at this stage not regarded as attainable, unless the release strategy from the proposed dam can result in more assured flow in the river during August to October. This aspect will be investigated during the Impact Assessment.

8.1.3 Strategic Downstream Users

A reduction in the quantity and quality of the water in the Groot Letaba River system will potentially impact on downstream users. The Kruger National and Mozambique are two significant downstream users.

International obligations to Mozambique must not be compromised by the implementation of this project. In this regard, the Department of Water Affairs and Forestry is following the recommendations and conditions contained within the Revised SADC Protocol on Shared Watercourses and continuously liaise with the co-basin countries through the Limpopo Basin Permanent Technical Committee.

The Kruger National Park not only contributes significantly to South Africa's responsibility to maintain the country's biodiversity as committed in the signing of the United Nations Convention on Biodiversity (1992), but is also is a major economic driver in the region and contributes significantly to the national economy. The water required (quantity and quality) to maintain these functions is a priority.

8.1.4 Water Quality

The issues with respect to water quality centre around two effects. The first is the storage of a large quantity of water in the proposed dam, which can lead to eutrophic conditions and an increase in salinity due to the concentrating effect of evaporation losses. These problems tend to be accentuated during periods of prolonged low inflow.

The second issue is a possible change in water quality in the river downstream of the dam. The change can be far-reaching, such as a cumulative change in salinity as a result of reduced flows, or it can be of a local nature, such as changes in temperature directly downstream of the dam due to the release of colder bottom water.

8.2 TERRESTRIAL ECOLOGY

The main factors of disturbance in the project area are human settlements, agriculture and forestry. Nearly 60 % of the project area is transformed or degraded by such developments.

According to Rouget et al (2006):

- Critically Endangered vegetation types have been transformed to such an extent that the remaining habitat is less than that required to represent 75% of species diversity.
- Endangered vegetation types have lost up to 40 % of their original extent, and are exposed to partial loss of ecosystem function.
- Vulnerable vegetation types have lost up to 20 % of their original extent, resulting in some ecosystem functions potentially being altered.
- Least Threatened vegetation types have retained more than 80% of their original extent, and disruption of ecosystem functioning is assumed to be insignificant.

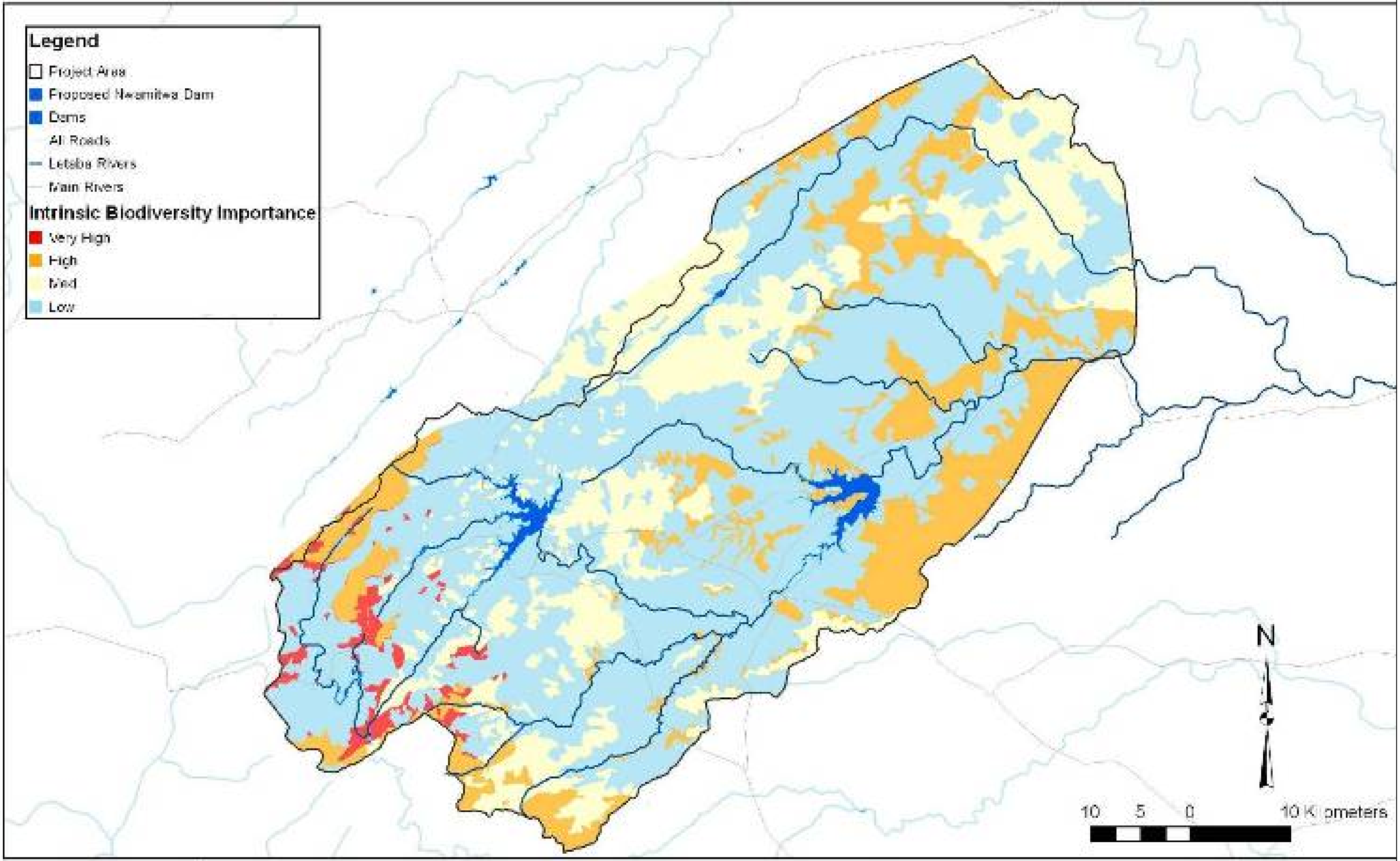
On this basis, Woodbush Granite Grassland is the most threatened of the vegetation types. However, being in the upper catchment, it (and Northern Escarpment Quartzite Sourveld – Vulnerable) is not likely to be directly affected by the proposed developments. Conversely, Tzaneen Sour Bushveld (Endangered) is likely to be impacted by water-supply projects downstream of the proposed Nwamitwa dam. Moreover, the inundation of the dam will directly impact on Granite Lowveld, a Vulnerable vegetation type.

Although a total of 256 species of Red Data flora and fauna could potentially occur in the study area (147 plant, 45 mammal, 48 bird, 9 reptile & amphibian, and 7 invertebrate), at least 107 species could be endemic or near-endemic (locally or regionally), and 284 are likely to be protected, the construction of the infrastructure components of the proposed project will not affect the terrestrial ecology of the entire

catchment or study area. There impacts will only be experienced locally in the areas where there are construction activities.

Figure 8.1 depicts an integration of the spatial conservation importance / sensitivity profiles for the biotic groups. This map is designed to inform the development planning process, and to provide a basis for impact assessment.

Vegetation types have been ranked and assigned importance ratings ranging from Low to Very High. Areas designated of high conservation importance for a particular biotic group would be considered 'sensitive' to development because of the potential impacts of such development on that particular group. **Table 8.5** summarizes the levels of conservation importance of each vegetation type in terms of the conservation-important biota potentially represented there.



water & forestry

ILISO CONSULTING

GROOT LETABA RIVER WATER DEVELOPMENT PROJECT (GLeWaP)

CONSERVATION IMPORTANCE OF INTRINSIC BIODIVERSITY

FIGURE 8.1

Date
Map Ref
System

Table 8.5: Level of conservation importance of each vegetation type

Importance value	Number of species									
	Granita Lowveld	Gravelotte Rocky Bushveld	Lowveld Rugged Mopaneveld	Northern Escarpment Quartzite Sourveld	Northern Mistbelt Forest	Ohrigstad Mountain Bushveld	Subtropical Freshwater wetlands*	Tsende Mopaneveld	Tzaneen Sour Bushveld	Woodbush Granite Grassland
Plants	High	High	High	Very High	High	High	Med	High	Very High	Very High
Mammals	High	Med	Med	High	High	Med	Low	High	Med	High
Birds	High	Med	High	High	High	Med	Low	High	Med	High
Reptiles & Amphibians	Med	Low	Low	High	High	Low	Med	Med	Med	High
Invertebrates	Very High	High	High	Med	Med	Med	Very High	Very High	High	Very High
RANK	2	8	7	2	5	9	10	2	6	1
Intrinsic Biodiversity Value	High	Med	Med	High	High	Med	Med	High	Med	Very High

It also attempts to rank the vegetation types on the basis of their 'intrinsic biodiversity' reflected in the integration of all the component importance values. Thus some idea of intrinsic biodiversity value or 'ecological sensitivity' is realized and mapped **(Figure 8.1**).

Vegetation types with the highest percentage area intact, with the highest biodiversity values, and that are the most threatened are those that are likely to present the greatest constraints to development. Conversely, those with the lowest percentage area intact, with the lowest biodiversity values, and that are the least threatened are those that are likely to present the greatest opportunities for development.

On this basis, it is apparent from **Table 8.6** that those vegetation types that have most area intact do not have a particularly high biodiversity value, and are also not significantly threatened (e.g. Gravelotte Rocky Bushveld and Lowveld Rugged Mopaneveld). These would probably offer most opportunity for development. Conversely, those that have least area intact do have High biodiversity values and are significantly threatened (e.g. Granite Lowveld, Tsende Mopaneveld and Tzaneen Sour Bushveld). These would probably present the greatest constraints to development.

Table 8.6: Biodiversity Value and Degree of Transformation per vegetation type

Vegetation Type	Ecosystem Status	Intrinsic Biodiversity Value	Natural Area (ha)	Transformed & Degraded area (ha)	% Natural
Granite Lowveld	Vulnerable	HIGH	24 104	72 909	25%
Gravelotte Rocky Bushveld	Least Threatened	MEDIUM	4 480	1 379	76%
Lowveld Rugged Mopaneveld	Least Threatened	MEDIUM	17 737	11 061	62%
Tsende	Least Threatened	HIGH	23 903	35 549	40%

Vegetation Type	Ecosystem Status	Intrinsic Biodiversity Value	Natural Area (ha)	Transformed & Degraded area (ha)	% Natural
Mopaneveld					
Tzaneen Sour Bushveld	Endangered	MEDIUM	53 368	60 536	47%
Total			123 592	181 434	41%

Site-specific ecological field surveys and impact assessments will take place before development commences. On site surveys of flora and fauna will be undertaken in summer from October 2007 to February 2008. It will therefore be possible to screen all of the conservation-important plant and animal species potentially present in the project area, making assessment of ecological sensitivity at farm scale more objective. The potential impacts of the proposed development would be more clearly identified, and mitigation measures to reduce impacts will be more accurately defined.

8.3 SOCIAL PROCESSES

8.3.1 Potential impacts as a result of demographic processes

The demographic profile of the communities in the study area (**Chapter 5**) is typical of rural communities, with low education and employment levels. Increasing the population density in an area which is already overpopulated and poor could lead to negative and positive impacts. If the community has the capacity to accommodate additional people, the presence of construction workers could lead to a temporary boost in the local economy as a result of construction workers making use of local services. However, a community that is unable to meet its own needs might be unable to sustain additional demands on the local services, which might lead to conflict if services are depleted (e.g. the local grocery store running out of supplies due to the extra demand) or not provided adequately (e.g. sanitation).

Interaction and relations between local communities and construction workers might lead to illnesses, death and/or births. Dam failure can lead to the loss of life and

severe injuries, as well as psychological trauma, which leads to demographic changes.

The high percentage of females imply that males out-migrate, and/or are outlived by females. It is possible that there is a high percentage of child-headed households in the study area. The high percentage of young people and women imply they are probably most severely affected by lack of money and resultant developmental problems such as lack of water, walking long distances to fetch water, lack of electricity, accessibility to health facilities, etc. The project should focus on improving the quality of life of these vulnerable groups by giving them job opportunities.

The IDP of the MDM suggests that the level of literacy has a bearing on employment and urbanisation status. The bulk water distribution area, which will benefit from the proposed dam, consists of rural villages. The literacy and employment levels are therefore most likely to be low. This has implications for the type of jobs they will be able to do, and the extent of the economic impact on their lives.

8.3.2 Institutional change processes and municipal service impacts with the project

During construction, institutional changes can be expected as a result of the project as the influx of people will put a strain on institutional structures. The resultant health and safety, and environmental impacts could be significant. This will also depend on whether construction workers will be housed in communities or in a construction village.

During operation, settlements, agricultural production of commercial farmers and emerging black farmers, as well as the tourism industry between the Drakensberg Escarpment and the Kruger National Park will benefit. The positive impacts are the health benefits, increase in social equity, stabilised economic growth, and employment opportunities. However, the significance of the impact depends whether institutional processes are such that:

- Safe, reliable water supplies for domestic and industrial use are supplied;

- The frequency, intensity and duration of restriction on the use of water allocated for irrigation of high value crops are minimized ;
- . Resources are distributed equitably;
- Maintenance is done;
- Unauthorized connections are managed;
- Cost recovery is managed;
- Multi-disciplinary planning and co-operation at appropriate levels of government is done to enable inclusive long term plans to be drawn up;
- The integration of the project with the Spatial Development Frameworks of municipalities;
- The integration of the project with the seven industrial clusters, specifically horticulture and livestock production.

8.3.3 Land use change processes and potential impacts

The proposed dam basin will inundate commercial citrus farms and may potentially impact on some houses and possibly small-scale farming areas.

The size of the dam must therefore be such that it indeed optimally benefits the beneficiaries. The risk is that a dam built to full capacity might not optimally benefit the beneficiaries. For example, the water may cover important infrastructure which might negatively impact on many users in and on the borders of the proposed dam basin. Building a smaller dam might mitigate these impacts. It is therefore necessary to understand the impact of different full supply levels on the beneficiaries to propose an optimal full supply level. This will also have positive implications for DWAF in that the economic and social impacts will be reduced, positively impacting on the sustainability of the GLeWaP.

To determine the optimal full supply level, the impacts of different proposed purchase levels should be assessed in more detail in the EIA Phase. The implication of different full supply and purchase levels on the livelihood and quality of life of beneficiaries should be considered, to contribute to the selection of an optimal full supply level. "Optimal benefit" will have to be defined, based on the definitions of livelihood and quality of life, and the data gathered.

8.3.4 Socio-cultural change processes

Socio-cultural processes are the way in which humans behave, interact and relate to each other and their environment and the belief and value systems which guide these interactions. This includes the movement patterns, which indicate how relationships are maintained, and the way in which space creates a sense of place.

Cultural Landscape

Little information on the cultural landscape and attachment to place within the study area is available at this stage, and will have to be further assessed in the Impact Assessment Phase. Tribal Authorities in the area will have to be identified, and the heritage specialist report will have to be accessed. The nature of the cultural landscape will give an indication of the level of attachment to place. Components that give an indication of the cultural landscape are:

- Genealogical Landscape
- Knowledge of Place
- Place-based Values and Ethics
- Environmental knowledge
- Home place and identity

(Cultural Attachment to Place: A Framework for Identifying and Working with Traditionally Associated Peoples in Southern Appalachia Benita J. Howell, 2003).

Sense of place

The potential impact on socio-cultural behaviour and the related perception of environmental changes could either have a positive or a negative impact on sense of place. It could be positive if people perceive the project as a means of job creation, free water, and infrastructural and/or economic development, not intrusive and safe. Potential negative impacts include the visual impact and the resultant intrusion on sense of place.

People choose to live in an area because of what they value: status, safety, nature, family links, etc. A sense of connectedness a person/community feels towards a place or places develop as a result of these values. Much of what is valuable in a culture is embedded in place, which cannot be measured in monetary terms. Place attachment may be evident at different geographic levels, e.g. site specific (e.g. a house, burial site, tree where religious gatherings take place), area specific (e.g. a region), and physiographic specific (attachment to the look and feel of an area). Personal emotions, memories and cultural activities are associated with a place. It is because of a sense of place and belonging that some people loath to be moved from their dwelling place, despite the fact that they will be compensated for the inconvenience and impact on their lives. Once the proposed dam basin is filled with water, the current land use, sense of place and cultural landscape will be permanently lost changed. The related impacts on a psycho-social level will be different for different people and will have to be assessed in more detail in the EIA Phase.

Socio-cultural processes and Construction workers

Construction workers form part of a significant section of the South African population known as migratory workers. The social cultural issues associated with this section of the population have been thoroughly researched. Due to their unique situation, construction workers engage in behaviour that makes them vulnerable, such as risky sexual behaviour (e.g. unprotected sex) and destructive behaviour (e.g. alcohol abuse, damaging the environment), which could be explained by their migratory status. When they are separated from their homes, they are also distanced from traditional norms, prevailing cultural traditions and support systems that normally regulate behaviour within a stable community. In addition, it might also be that construction workers who are faced with dangerous working conditions and the risk of physical injury might be more preoccupied by immediate (direct) risks and therefore

tend to disregard salient (more indirect) risks, such as HIV infection. Again, it is likely that HIV transmission occurs, as the local population might be uneducated about the risk and transmission of HIV and would therefore more easily engage in risky behaviour as a result of ignorance. More money in circulation from construction workers also impacts on the family structure as preference is given to money over family.

Not only do health issues impact on communities, but the physical safety of communities can also be endangered as a result of the influx of job seekers and construction workers (e.g. potential increase in crime). This has a negative mental health impact, such as fear. Conflict could also occur as a result of alcohol abuse, resentment that locals did not get jobs, and cultural differences.

The construction activities, construction vehicles and movement patterns of these vehicles and equipment could also impact on the health and safety of communities. However, this only becomes a real concern if such activities occur in close proximity to roads and settlements.

8.3.5 Bio-physical change processes and potential impacts

The construction workers could be housed in a construction village or the surrounding communities. Their presence will impact on the environment, which in turn will impact on the surrounding communities. Littering and water pollution, air, and dust pollution could be experienced during the construction phase of the project.

Vehicles used for construction and maintenance activities could also create air and dust pollution, and further damage the environment. New and/or temporary roads will have to be opened, blasting will take place, noise will increase, and the environment might degrade aesthetically.

As a secondary impact, the presence of roads leading to the dam may open up a previously inaccessible natural environment, resulting in the consequences of tourism activities: destruction of wildlife or waterfowl habitats, over-usage of certain areas, pollution from litter and motor vehicles, wildlife disturbance, etc.

During operation, the presence of the dam could lead to health impacts, for example the presence of mosquitoes and bilharzia could be exacerbated. There are also positive health impacts:

- The availability of water for washing and bathing will prevent diseases such as trachoma, scabies, and fungal skin diseases;
- Water borne diseases e.g., typhoid, dysentery and diarrhoea will be prevented by the provision of clean water and sanitation;
- Removal of breeding sites will prevent diseases e.g. malaria and dengue;
- Removal of habitat can prevent diseases such as guinea worm.

8.4 ECONOMIC PROCESSES

The proposed project could impact on the following economic aspects:

- Economic effect

The proposed project will have an impact on the economy due to the financial spending (estimated to be in the excess of R1 500 million), increased infrastructure investment and increased expenditure by employees.

- Employment

Temporary employment will be created during the construction phase of the project resulting in increased expenditure, as well as additional economic spin-offs that will result.

Since some of the high-intensity citrus farm land will be inundated by the proposed Nwamitwa dam, some of the farmers and farm workers could be negatively affected by job losses.

Temporary employment contracts will be terminated when the construction activities are complete. This could result in a loss of income and spending in the immediate

area at that time. Affected parties should be informed of this from the start of the project so that unrealistic expectations are not.

Full-time employment during the operation of the project may also have a permanent effect on the economy. Apart from any permanent directly created jobs there may be scope for other jobs due to spin-off effects in the economy as well as stimulation of additional income generating activities resulting from improved water supply. The proposed project could prevent job losses due to current water supply not meeting demands.

- Business output and sales

The employment opportunities created by the construction of proposed project may lead to an increase in buying power in the area leading to an increase in business sales and the opportunity for the development of new businesses sales.

Any persons that acquire employment in the operation phase of the project could experience an increase in their standards of living. The availability of water in the region may also stimulate income generating activities and impact on local business sales and standards of living.

- Government income and expenditure

The proposed project may cause an economic injection to the area that could lead to increased government income during both construction and operation. Any resultant new economic activities, such as tourism developments, could increase the tax base and income in the form of Company tax; PAYE; UIF; and Rates and taxes. The capacity of the local municipality to provide services may improve.

- Standards of living

Increased employment opportunities during construction and possibly operation could increase the buying power and size of the market in the area, increase entrepreneurial opportunities due to the needs of construction activities (such as building materials, or foodstuffs), and improve accessibility for local villagers to retail

outlets. New businesses may be established and a general increase in sales could raise the general standard of living in the area.

- Agriculture production and loss of agricultural land

Some agricultural land (mostly existing citrus plantations) will be inundated by the proposed Nwamitwa dam. The financial value of the permanent loss of agricultural land will be calculated during the EIA phase.

- Ownership and land use patterns

The proposed project will require land and servitude acquisition. Both private and traditional authority land will probably be affected.

- Stimulation of income generating activities

The improved ability to manage the water resources in the catchment during operation could stimulate the development of recreational opportunities and tourism related development. This could cause a permanent economic upliftment in the area. Property values.

8.4.1 Property values

Property values and the sale of property during the construction period could be negatively affected due to uncertainty of property owners and potential new property owners of the impacts of the proposed project. Potential new property owners could be deterred from purchasing property or farm land that is near to the site due to the perceived negative impacts of the construction such as safety and security, increased crime, increased population, workers camps, etc.

It is not foreseen that property values will be affected negatively during the operation/maintenance phase. Property values on looking the Nwamitwa Dam could even possibly increase in value.

8.5 PHYSICAL INFRASTRUCTURE

Some existing infrastructure (roads, electricity supply, pipelines, tele-communications, railways, other facilities) could be directly impacted on by the proposed infrastructure development project. Any temporary or permanent disruptions in these services must be mitigated.

Of particular concern are the R529, D1292 and P43/3 will have to be re-aligned to accommodate the dam. This may result in longer distances for villagers, general road users, and citrus farmers who need to transport input requirements and citrus products to and from farming enterprises. Temporary road diversions may also be required to accommodate specific construction activities.

8.6 PUBLIC HEALTH

Instead of having a flowing river, the construction of the dam will result in a standing body of water. Not only is the nature of flow different, but the extent of the water means that the vectors of disease associated with water are now closer to where the people are living (**Figure 3.1**).

Construction workers' situations make them vulnerable to high-risk sexual behaviour. There are ample research results to indicate that there is a direct link between temporary migration and HIV infection. Research also seems to indicate that construction workers might be more at risk of contracting HIV from members of local communities, as opposed to transmitting the infection to community members. An HIV/Aids survey should be carried out before the project and a follow up study once the dam is completed. The study should include the contract workers from and their families who accompany them and advocacy on how to prevent transmission of HIV should be provided. The feasibility of this should be assessed. The United Nations have drawn up guidelines on HIV/Aids and large projects.

The potential benefits of reticulated clean water, with improvements in sanitation and hygiene, as well as those associated with a general increase in the standard of living, are, however, large.

8.7 HERITAGE RESOURCES

Cultural heritage resources are broadly defined as all non-physical and physical human-made occurrences, as well as natural occurrences that are associated with human activity. These include all sites, features and objects of importance, either individually or in groups, in the history, architecture and archaeology of human (cultural) development. The study area is known to have some areas where archaeological sites may occur.

8.8 MINIMISING CONSTRUCTION RELATED IMPACTS

The actual physical construction activities are known to have some very specific impacts in addition to the impacts on the river (**Chapter8.1**), on the terrestrial ecology (**Chapter 8.2**), and on social and economic processes discussed in **section 8.3** and **8.4**. These include increased traffic, noise, and dust.

8.9 OTHER ISSUES

Other issues that have been raised, but not considered key are:

- Water Rights;
- Climate Change; and
- Sedimentation.

8.9.1 Water Rights

Landowners likely to be affected by the proposed dam basin would like to know how their water rights will be affected by expropriation of land for the Government Water Works. This applies firstly to landowners that may lose a part of their farm, but will still be left with a viable piece of land. They would like to know whether they will be able to keep the full current allocation of water that they have. Secondly, many farmers own a few different pieces of land in the area. If they cannot continue to farm on the remainder of land after land acquisition, will they be able to exercise the water allocations currently on land that will be inundated on a completely different piece of

land? This includes surface water abstraction and groundwater. Some farmers have boreholes that may be inundated by the proposed dam that they would like to have replaced.

Some people (emerging black farmers) living in the villages in the area would like to have access to more water than they currently have. They would like to know what the process is for them to apply for this.

These issues are not considered environmental impacts of or on the project, but rather process queries that will be addressed directly.

8.9.2 Climate Change

Both the questions of whether climate change has been taken into account in the formulation of the project and whether the project could have an impact on climate change have been considered.

The concerns around the first aspect relate to possible changes in the availability of water or land use conditions in the region as a result of climate change. If this were to actualize, the impact would be on the flow (hydrology) in the river. Available climate change prediction models have been considered, but different models provide different specific local predictions and all with high levels of uncertainty. The possibility of climate change affecting the flows in the river is therefore accommodated in the hydrological modelling by building in a margin for error in the future predictions, which is common accepted practice.

Secondly, the surface area of the dam will be relatively small in terms of global climate change factors. It is expected that the dam will not have any noticeable impact on the climate of the region.

Climate change will therefore not be studied in further detail in the EIA phase of the project.

8.9.3 Sedimentation

The significance of the impact of changes in sedimentation downstream of the proposed dam was raised as a concern by a stakeholder representing the Kruger National Park. This will be investigated in the Impact Assessment Phase.

9. PLAN OF STUDY FOR EIA

9.1 INTRODUCTION TO THE EIA PHASE

The Scoping Phase of the project focuses on identifying and describing the key issues that require specialist investigations in the EIA (**Chapter 8**). These specialist studies will be undertaken in the EIA Phase of the project. Likely impacts identified will be confirmed and evaluated according to criteria (**Chapter 9.4**) to determine their significance. Mitigation measures to minimize any significant negative impacts and optimized on beneficial opportunities will be proposed.

Alternatives to the proposed project have been fully investigated (**Chapter 4**) and confirm that the proposed project is the preferred option. The specialist studies will therefore only focus on the proposed project and not investigate the alternatives any further.

The Public Participation Process that commenced with the Announcement and Scoping Phase will continue in the EIA Phase (**Chapter 9.5**).

This project is being subject to an internal peer review to be undertaken by Sean O Beirne. Sean has an MSc in Geography and 16 years experience in leading and managing environmental assessments in South Africa, Mozambique and the Russian Federation, the design and implementation of Environmental Management Systems (EMS) for ISO 14001 Certification and post EIA Environmental Management Programmes (EMPs), and applications of Strategic Environmental Assessment (SEA). He has been involved in the peer and external review of major projects in South Africa. Sean is responsible for the peer review of the project.

9.2 SPECIALIST STUDIES

The following specialist studies will be undertaken in the EIA Phase:

- Aquatic Ecology;

- Water Quality;
- Terrestrial Ecology;
- Heritage Resources;
- Social and Landuse Processes;
- Health Impacts;
- Economic Processes;
- Traffic Impacts;
- Visual Impacts;
- Noise Impacts; and
- Air quality.

All specialist studies will be undertaken in compliance with regulation 33(2) of GN 385, and will include:

'(a) details of –

(i) the person who prepared the report; and

(ii) the expertise of that person to carry out the specialist study or specialised process;

(b) a declaration that the person is independent in a form as may be specified by the competent authority;

(c) an indication of the scope of, and the purpose for which, the report was prepared;

(d) a description of the methodology adopted in preparing the report or carrying out the specialised process;

(e) a description of any assumptions made and any uncertainties or gaps in knowledge;

(f) a description of the findings and potential implications of such findings on the impact of the proposed activity, including identified alternatives, on the environment;

(g) recommendations in respect of any mitigation measures that should be considered by the applicant and the competent authority;

(h) a description of any consultation process that was undertaken during the course of carrying out the study;

(i) a summary and copies of any comments that were received during any consultation process; and

(j) any other information requested by the competent authority.'

Any mitigation measures required will be defined for inclusion in the EMP.

In addition to the specialist studies mentioned above, the significance of the impact of changes in sedimentation downstream of the site, resulting from building the proposed dam at the site known as Nwamitwa will be investigated in the Impact Assessment Phase.

9.2.1 Aquatic Ecology

The aquatic ecology specialist study will be undertaken by Veronica Rall from Golder Africa Associates (Pty) Ltd. Veronica Rall is an experienced aquatic scientist with an MSc in Natural Sciences. She has conducted various aquatic ecological studies relating to all the major ecological components associated with fluvial hydro systems (ecological and biotic integrity assessments, species assemblages - fish and invertebrates, population dynamics, Instream Flow Requirement studies, establishment of microhabitat suitability criteria, water quality and quantity

assessments, toxicity and ecological risk assessments, pathway assessments, habitat assessments and functional status assessments) in South Africa and neighbouring countries (Lesotho, Swaziland, Botswana, Namibia and Angola) over the past 12 years.

Information gathered for the Letaba Catchment Reserve Determination Study (DWAF, 2006) is adequate to assess the impacts of the proposed dam on the aquatic fauna of the downstream Groot Letaba River. Available baseline data on the aquatic fauna and riparian vegetation is comprehensive. Some additional information will however be required to assess the impact of the proposed dam on the Nwanedzi River, habitat alteration and destruction within the dam basin and the disruption of longitudinal connectivity. The information provided by the Letaba Catchment Reserve Determination Study (DWAF, 2006) will also be used as basis for the development of a release strategy for the maintenance of the downstream PES for fish, aquatic macro-invertebrates and riparian vegetation components of the concerned aquatic system (as determined during the Reserve Study, DWAF, 2006). This will be conducted with input from the hydrologist in order to ascertain the supply and availability of water for use by the downstream ecosystem.

Table 9.1 Aquatic Ecology Tasks

Timing	Task
July 2007 – August 2007:	Obtain high resolution satellite imagery of the proposed dam's area of impoundment and plan field survey
October 2007:	Conduct a field survey to obtain additional data required Field survey to gather data on the aquatic fauna and riparian vegetation of the Nwanedzi River and the proposed area of inundation, using standard bioassessment protocols Obtain samples for genetic assessments in order to assess the degree of genetic variation in upstream and downstream fish populations
By February 2008:	Liaise with other specialists, especially Hydrologist. Use existing Reserve (DWAF, 2006) as basis for the development of a release strategy for the maintenance of the downstream PES for the fish, aquatic macro-

Timing	Task
	invertebrates and riparian vegetation. Compile and submit draft EIR, pre-construction and construction EMP.
	The Final EIR and EMP will be submitted two weeks after receipt of comments from the client.

9.2.2 Water Quality

Dr Martin van Veelen will undertake the water quality specialist study.

The effect of the proposed dam on water quality will be studied as follows:

- Obtain all available water quality data from the Department of Water Affairs and Forestry's data bank.
- Determine from the data the current water quality as well as an assessment of the natural background conditions.
- Predict the water quality in the dam by means of a mass balance.
- Predict the changes in water quality downstream of the dam by analyzing a future predicted steady-state flow condition.
- Assess the fitness for use of the predicted water quality in terms of the South African Water Quality Guidelines for the uses of the water that have been identified.
- Propose mitigating measures where needed and appropriate.

Previous water quality studies, especially the work that was done to determine the Reserve, will be used to verify the results of the study and to derive the resource quality objectives.

9.2.3 Terrestrial Ecology

The Terrestrial Ecology specialist study will be undertaken by a team from Ecorex lead by Graham Deall. Graham Deall is a terrestrial ecologist and is registered as a botanical scientist with the South African Council of Natural Scientific Professions (SACNASP). He has an MSc in Vegetation Ecology, and has 25 years professional experience in Southern Africa (mostly South Africa, Swaziland and Lesotho). His experience covers vegetation surveys and mapping, conservation evaluation, impact assessment, impact mitigation, vegetation monitoring, range-condition assessment, land-use evaluation and plant-resource assessment. For the past 10 years he has specialised in Terrestrial Ecological studies for Environmental Impact Assessments involving dam-building, radio-tower construction, open-cast mining, township establishment, resort development, irrigation schemes, transmission lines, water supply projects, roads and railways.

Site-specific ecological field surveys and impact assessments will be undertaken for the areas that will be directly affected by construction activities. On-site surveys of flora and fauna will be undertaken in summer from October to February. It will therefore be possible to screen all of the conservation-important plant and animal species potentially present in the directly affected areas, making an assessment of ecological sensitivity more objective. The potential impacts of the proposed development will be more clearly identified, and mitigation measures to reduce impacts defined.

Crucial aspects to be included in field surveys are outlined for each biotic group as follows:

Plants

The nine most significantly threatened plant species potentially present in the project area and which will be carefully searched for during field surveys are listed in **Table** 9.2 with an indication of the most favourable survey time (to co-incide with the flowering season).

Table 9.2: Plant species to be especially targeted during detailed summer surveys

Species	Family	Form	RD Status	Flowering season	Flower colour
Aloe monotropa	Asphodelaceae	Succulent	VU	Sep-Dec	Red
Borassus aethiopica	Arecaceae	Tree	LC	Not important	Not important
Encephalartos transvenosus	Zamiaceae	Tree	STBA	Not important	Not important
Ensete ventricosum	Musaceae	Tree	LC	Not important	Not important
Melinis tenuissima	Poaceae	Grass	LC	Apr-Jun	Not important
Mondia whitei	Apocynaceae	Climber	LC	Oct-Feb	Green/Purple
Oberonia disticha	Orchidaceae	Epiphyte	NT	Feb-Mar	Straw
Siphonochilus aethiopicus	Zingiberaceae	Geophyte	VU	Nov-Dec	Pink/Mauve
Xylopia parviflora	Annonaceae	Shrub	LC	Oct-Dec	Yellow/Green

Stakeholders raised concern that some plants in the study that have importance to local communities could be affected by the project. The terrestrial ecology specialist study will include identifying these plants and their locations, with the assistance of knowledgeable locals from the area, in their specialist study.

Mammals

In order to provide mitigation for potential impacts on mammals, an attempt will be made to confirm the presence of Red Data mammals. The following strategy will be adopted in the remaining non-transformed areas of vegetation:

- Rocky outcrops will be searched for bat roosts, elephant shrews;
- Nocturnal surveys will be conducted to search for hedgehogs, rodents, shrews;
- Drift fence / pitfall traps used in the reptile surveys will be checked for small mammals ; and

- Walk-in traps (e.g. Sherman traps) to be laid in transects through representative habitats; for a minimum of five days.

Birds

In order to provide mitigation for potential impacts on mammals, an attempt will be made to confirm the presence of Red Data bird species. The following strategy will be adopted in the remaining non-transformed areas of vegetation:

- Early morning searches to be conducted along the perennial rivers in order to search for numerous threatened water-associated species;
- As many large trees as possible to be searched for bird of prey nests, particularly along the rivers and in mature woodland; and
- Representative transects will be walked through all relevant habitats and all bird species heard and seen will be recorded.

Reptiles and Amphibians

The presence of threatened, endemic and protected reptiles and amphibians will be confirmed in order for impacts to be mitigated. The following sampling techniques will be used:

- a proportional number of drift fences combined with pit-fall traps will be constructed in each major vegetation type;
- nocturnal searches will be conducted between October and January (calling season of Pyxicephalus adspersus); in order to optimise likelihood of finding the bullfrogs, the searches will be conducted soon after heavy rains; and
- Likely reptile habitat, such as large rock slabs, will be surveyed during the day for resting reptiles.

Invertebrates

Field surveys for invertebrates will include night-time searches with ultraviolet light for the protected scorpions, especially the three predicted Hadogenes species, as presence/absence of Hadogenes can only be reliably ascertained by using this

technique. Daytime searches for these and all other protected scorpion species will also be carried out.

A combination of pitfall trapping and day-time searches will be used to confirm presence/absence of the protected beetle and spider species and surveys will be carried out during the wet summer months (November-March).

Visual searches and netting will be required to survey dragonfly, damselfly and butterfly populations. However, non-overlap of flight periods of the butterflies (September-November for Wolkberg Widow and Lotana Blue, November-December for Stevenson's Copper, December-January for Wolkberg Zulu and February-March for Swanepoel's Brown) would lead to a requirement for at least three intensive surveys. Since all of the seven predicted Red Data Odonata and Lepidoptera species are only likely to occur well to the west and upstream of the proposed dam, and are therefore not likely to be impacted in any way, surveys will not be carried out for these species.

The EMP will include an appropriate invertebrate biodiversity-monitoring programme, including the description of baseline assessments of selected indicator taxa (e.g. Dromica spp.) that must be undertaken prior to any development of the site.

9.2.4 Heritage Resources

Dr Johhny van Schalkwyk will undertake the heritage resources specialist study. He has been working at the National Cultural History Museum, Pretoria, for the past 29 years. During that time he has actively done research in the fields of anthropology, archaeology, museology, tourism and impact assessment. This work was done in Limpopo Province, Gauteng, Mpumalanga, North West Province, Western and Northern Cape, Botswana, Zimbabwe, Lesotho and Swaziland. Based on this work, he has curated various exhibitions at different museums and has published more than 60 papers. During this period he has done more than 400 impact assessments (archaeological, anthropological and social) for various government departments and developers. Projects include roads, pipelines, dams, mining, water purification works, historical landscapes, refuse dumps and urban developments.

The study will be undertaken in compliance with National Heritage Resources Act (Act No. 25 of 1999), with special reference to Section 3. The heritage resources specialist survey the area to potentially be affected by the proposed development, identify and evaluate any sites, features and objects of cultural significance located in the area.

The impact of the proposed development on the sites or cultural material will be considered, and recommendations on steps to be taken prior to development will be made. These range from:

- High, where it would have a "no-go" implication on the project regardless of any mitigation;
- Moderate, where the impact could have an influence which will require modification of the project design or alternative mitigation;
- Low, where the impact will not have an influence on or require to be significantly accommodated in the project design, i.e. where no mitigation is required.

The significance of the sites, features and objects are determined by means of their historical, social, aesthetic, technological and scientific value in relation to their 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.

The methodology includes:

- Survey of the literature

  A survey of the available literature would be done in order to review previous research and to determine the potential of the area.

- Data bases

Various databases would be consulted. Locally, these would include the Archaeological Data Recording Centre (ADRC), housed at the National Cultural History Museum, Pretoria and the Environmental Potential Atlas.

- Other sources

  The topocadastral and other maps would be studied. Similarly, aerial photographs, if available, would be studied. Local knowledge, e.g. people working in museums or at universities would also be accessed.

The total area would be inspected. Normally, a number of parallel transects would be walked over the site and all sites, features and object identified would be recorded. Special attention would be given to archaeological sensitive areas, e.g. outcrops (for stone walled sites and rock engravings), hills (for settlements and rock shelters), river banks (for Iron Age settlements), etc.

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) and plotted on a map. Map datum used (locally): Hartebeeshoek 94 (WGS84).

Mitigation of heritage sites that will be destroyed or damaged during development generally involve documentation (photographing and mapping) and, or excavation. An important part of mitigation of sites in the development area that will not to be damaged or destroyed during development is preparation of a heritage resources management plan. The plan will contain recommendations on the management of the objects, sites or features, and will also provide guidelines on procedures to be implemented if previously unidentified cultural resources are uncovered during later developments in the area. The EIA will only include the specification of mitigation measures for sites found during the survey, but no application of this mitigation.

During the public participation process Mr Ramalepe from the BaKgaga BaMaupa Communal Property Association expressed concern about what will happen to ancestral graves, ruins and other places of importance, such as places of worship in

the project area that could be submerge by the dam or impacted on by the construction activities. Mr van Schalkwyk will liaise with Mr Ramalepe to find out the location of the sites mentioned.

9.2.5 Social and Landuse Processes

Anita Bron of MasterQ research will undertake the social and Landuse impact assessment. She has a Masters degree in Research Psychology focussing on Environmental Psychology. She specialises in Social Impact Assessments, Social Marketing Research and Monitoring and Evaluation. She has completed Social Impact Assessments for developments such as transmission power lines, distribution lines, pipelines, mines, and substations. As part of her Social Impact Assessments, she also addresses impacts on health and safety, tourism and socio-economy. She reviewed a SIA for a multi products pipeline. She is a guest lecturer at the University of Johannesburg and lectures post graduate classes on information gathering and focus groups. She is currently completing a Masters degree in Social Impact Assessment at the University of Johannesburg. She is a member of SAMEA, the South African Monitoring and Evaluation Association.

The recommended studies in order to assess the impacts on the social processes are:

- Assess the relative socio-economic impacts of three possible Purchase Lines based on three possible Full Supply levels (0.5 MAR, 1 MAR and 1,5 MAR) in order to inform the decision of the size of the dam (this part of the investigation will be undertaken during the Scoping Phase in order to inform the decision on the size of the dam);
- assess the impacts on the demographics of the directly affected communities;
- assess the potential impact of displacement and resettlement;
- assess information on the construction, maintenance and decommissioning activities, timeframes, workforce, and potential to employ and train local people;

- assess the service delivery capacity of municipalities during construction and operation;
- propose a process of implementing local employment mitigation measures;
- compare the potential impacts of housing workers in the communities vs. a construction village;
- assess how the project might impact on spatial development plans;
- asses the loss of agricultural land and changes in agricultural activities during construction and operation;
- assess potential safety and health impacts;
- assess community attitudes towards as well as understanding of and expectations from the project;
- assess the impacts of the proposed land acquisition process; and
- Assess impacts on cultural landscape, sense of place, movement patterns.

Data collection methods will include:

- Participant Rural Appraisal which will include focus groups, interviews, and observation;
- Interviews with municipal and the DWAF officials, as well as project managers;
- Case studies of dams in a similar context; and
- Desktop research, including assessment of the Issues and Response Register, and other specialist reports.

9.2.6 Public Health Impacts

The Health Impact Assessment will be undertaken by Margot Saner and Andrew Dickson of Margor Saner and Associates (Pty) Ltd. Ms Margot Saner and Mr Andrew Dickson are Certified Occupational Hygienists (COH), registered with the Southern African Institute for Occupational Hygiene (SAIOH). In order to register as a COH it is required that persons have a minimum Masters with a 4 year qualification and a minimum of 5 years field experience. Ms Saner has 30 years of experience and Mr Dickson has 12 years in Occupational Hygiene, Environmental modeling and Environmental consultancy. At Present Margot Saner and Associates services more than 100 companies with sound assessments and management plans.

The Public Health Impact Assessment Specialist will focus on possible public health impacts that may be caused, aggravated or improved by the project and its operation. These could be direct effects associated with water supply and quality, or indirect effects such as those of immigration and employment, in the context of the existing human population, its health problems, and health services. The geographical area that will be considered in this specialist study will be limited to the Groot Letaba River catchment.

Baseline characterisation

The Public Health Impact Assessment specialist will provide a brief overview of the common health problems in the project area and the current capacity of existing health facilities and services in the area. The focus of the Specialist study will be:

- To determine the approximate number and general state of health of the construction and maintenance workers;
- To determine the approximate number and general state of health of the surrounding community;
- To determine possible health effects of being on site for the construction and maintenance workers;

- To determine possible health effects due to the presence of the construction and maintenance workers on the community;

- To determine how sanitation, housing, the provision of safe drinking water, bulk infrastructure and unauthorised connections will be managed for the construction workers;

- To determine how construction activities will cause changes to the environment and the indirect impact can be expected on the health of construction and maintenance workers and the community, including dust and litter;

- To determine possible health impacts as a result of water pollution caused by agriculture and other industrial activities; and

- To determine possible health impacts and issues surrounding water-related diseases that may be influenced by the project, including malaria, bilharzia and sanitation related diseases.

Impact Assessment

The major issues to be considered in the impact assessment are:

Construction Phase

The will examine the specific health risks associated with construction, such as:

- Transmittable diseases from construction and maintenance workers to the community;

- Transmittable diseases from the community to the construction and maintenance workers;

- Impacts of construction activities on workers. These include, dust, noise, operation of heavy machinery and traffic, including accidents at the sites or on the roads;

- Impacts of construction activities on the community. These include, dust, noise, effects of operation of heavy machinery and traffic, including accidents at the sites or on the roads; and

- How safety issues will be communicated to communities.

Operational Phase

The study will examine the following specific health risks associated with the operational phase:

- Changing water levels in operational phase. The shoreline will be exposed as water levels drop. The effect of the substrate, clay or sand has the potential to affect community health;
- The change from a flowing river to a large body of water will affect the community in terms of water-borne diseases, such as bilharzia and malaria; and
- The positive effects of a supply of clean high-quality water on the health of the community should also be investigated.

Health Management Plan

The feasibility of a HIV/AIDS and screening programme for construction and maintenance workers will be investigated.

Conclusion

The specialist recognises that it is primarily the responsibility of the Department of Health to investigate and mitigate public health issues. However, as this project may, in specific areas, increase or otherwise accentuate specific health related problems, the specialist needs to briefly highlight these areas and recommend mitigation measures. Responsibility for implementation may be vested with the project proponent or another organ of State in the spirit and practice of co-operative governance.

9.2.7 Economic Processes

Kayamandi (Pty) Ltd will undertake the economic processes specialist study.

Russell Aird is the Managing Director of Kayamandi Development Services (Pty) Ltd. He has 20 years experience in the fields of urban economics, economic development,

rural development, housing development, industrial sector expansion, and socio-economic development and water transfer schemes. Russell has been involved in numerous water related projects, especially water augmentation schemes, where his speciality has been determining the social and economic impacts of dams and pipelines as well as the impact on the donor and receiving populations and economy. Projects he has been involved in include the Orange Vaal Augmentation Planning Study (VAPS), Vaal River Eastern Sub-System Augmentation, Orange River Re-planning, Olifants River Water Resources Development Project and Hartebeestpoort Industrial Water Pipeline. Russell is also the project manager for a multi year project, to provide Business Support to DWAF for the Development of Management Interfacing and Socio-Economic Systems. Due to the multi dimensional nature of development projects Russell has evolved into a competent project manager and has successfully undertaken numerous studies and coordinated various projects of a multi-sectoral nature.

Nanja Churr has a degree in Town and Regional Planning and has done training in Canada in the fields of Regional Planning and Economic Investment Analysis, the theory of economic development, and the practice of Economic Development. She has extensive experience in the field of socio-economic development of communities, inclusive of the dynamic impacts associated with urban frameworks and infrastructure development/upgrading, as well as in conducting economic profiles and complimentary analysis and interpretation. Nanja has been involved with numerous economic frameworks, development plans, urban revitalisation studies, integrated development planning, local economic development plans, socio-economic research, macro-economic analysis, feasibility studies and business plan development and economic impact studies. Her experience in socio-economic impact studies includes impact studies for mines, pipelines, dams, roads and other infrastructures.

The purpose of the economic impact assessment study is to:

- define and describe the receiving environment (local, regional, broader, etc) from an economic perspective, and to identify, analyse and in detail to assess the opportunities and constraints arising from or potentially limiting the proposed project;

- assess the development impact of the proposed project on the economy of the region (including the improvement of the tax base), which will form an important component for establishing the overall feasibility of the Project; and

- quantify the impact of the proposed project on GGP, new business sales, employment, income generation; loss of resources, and personal income.

The various measures of direct economic impacts include:

- Total employment which reflects the number of additional jobs created by economic growth. This is the most popular measure of economic impact because it is easier to comprehend than large, abstract Rand figures. The total employment can be interpreted in terms of generally accepted definitions of job creation.

- Aggregate personal income rises as pay levels rise and/or additional workers are hired. Either or both of these conditions can occur as a result of business revenue growth. As long as nearly all of the affected workers live in the study area, this is a reasonable measure of the personal income benefit of a project or program.

- Value Added (which is normally equivalent to Gross Domestic Product or Gross Regional Product) is a broader measure of the full income effect. This measure essentially reflects the sum of wage income and corporate profit generated in the study area. However, in today's increasingly global economy, value added can be an overestimate of the true income impact on a local area, insofar as it includes all business profit generated there.

- Business Output (also referred to as revenue or sales volume) is the broadest measure of economic activity, as it generates the largest numbers. It includes the full (gross) level of business revenue, which pays for costs of materials and costs of labour, as well as generating net business income (profits).

- Property Values are also a reflection of generated income and wealth. When property values rise in a community as a result of increasing demand for

property that may be a direct consequence of increasing aggregate personal income or investment of business profits.

Information required will largely be accessed from site inspections, interrogation of maps and aerial photographs, technical discussions and meetings with local role players and stakeholders. Use will be made of existing databases and results from existing studies wherever possible.

Inception and delineation of study area

An assessment needs to be made on the current state of the economy in the project area. In order to undertake this study it would be essential to undertake a site visit in order to obtain key primary data and to delineate the study area.

For the purpose of economic analysis, a delineation of the study area is required. The study area and areas of impact need to be delineated into primary (local), secondary (surrounding area of impact) and tertiary area of investigation (broader area and International such as Mozambique). The primary area refers to farm areas and settlements directly affected by the dam and the length of area on which the proposed pipeline and related dam infrastructure will be located. The surrounding areas and communities/villages refer to the secondary area of investigation and the tertiary area of investigation refers to the broader area, major towns, municipal areas and District that will be economically impacted.

Base profile

To determine the potential economic impact that the proposed project will have on the region, it is necessary to compile a base profile of the study area. The data attained here will need to form the baseline data to be utilised in an input/output model. The profile will include economic structure, identification of sectoral development opportunities according to the SIC, sectoral production, economic base, employment, growth, potential, trends per sector (especially agriculture and tourism), specialisation, linkages and comparative advantages.

Impact Modelling and assessment

During scoping the following economic impacts, which need to be considered and quantified in this study, were identified:

- Economic effect
- Employment
- Business output and sales
- Government income and expenditure
- Standards of living
- Agriculture production and loss of agricultural land
- Ownership and land use patterns
- Stimulation of income generating activities
- Property values

The input-output model will be utilised to quantify the impact. The model will take cognisance of all the economic gains and losses. An assessment (quantitative and qualitative) is therefore required of the economic impacts.

The potential impact that will be incurred should there be some undue delay in the implementation of the proposed project should also be included. This implies the opportunity costs need to be determined.

The identified impacts need to be assessed in terms of nature, extent, duration, intensity, frequency of occurrence, probability, and will include reference to both positive and negative impacts during both operation and construction.

The current values of the impacts need to be calculated as well as the exact location and timing of the impacts. The techniques to be used to calculate the current value will depend on the nature of the particular element (e.g. gross margin per hectare in the case of irrigation land). Depending on the nature of the particular element, this

current value should be discounted over a certain period at a certain rate to arrive at the relocation or compensation costs.

Cognisance should also be taken of direct growth expectations and indirect growth expectations.

Impact and management measures reporting
Management and mitigation options that identify alternative ways of meeting needs, bringing about changes in plans, improving monitoring and management, and improving negative perceptions will be defined.

The specialist study will include:

- Economic baseline data (qualitative and quantitative);
- Positive and negative quantification of economic impacts, issues and aspects covering nature, extent, duration, intensity, frequency of occurrence, probability, and legal requirements (where applicable);
- Management plan to guide the development and maximize positive economic impacts and minimize negative economic impacts; and
- Recommendations: key interventions required to address risks and meet economic needs.

9.2.8 Traffic Impacts

Bert de Vries of ILISO Consulting will undertake the traffic specialist study. Bert is a registered professional engineer and specialises in traffic and transportation planning. He has been involved in a variety of Traffic Impact Assessments for major developments and environmental impact assessments. He has 30 years of traffic and transportation experience on projects in the Western and Eastern Cape, Gauteng and Swaziland.

The TIA will address the impact during construction and after completion of the dam. The TIA will investigate the effects of the relocation of roads on local travel around the dam.

Data Collection

Existing traffic information will be collected on the road network surrounding the dam, R71, P433 and the district roads which form part of the road network affecting the Nwamitwa Dam.

The traffic surveys will be undertaken to compliment the existing traffic data. Classified traffic counts will be undertaken from 06:00 – 18:00. In addition to traffic counts, vehicle occupancy counts will be undertaken to establish the number of person trips affected by the relocation of the roads.

Pedestrian and other non-motorised traffic will be surveyed. Limited origin and destination surveys might be undertaken for pedestrian and other non-motorised travel to determine the in- or decrease of travel distance between their origins and destinations.

Construction information will be collected to determine the flow of persons, goods and materials during construction. Furthermore the use of the dam for other than for bulk water uses will be ascertained, which might generate traffic after completion of the dam.

Road network information, road width and surface conditions as well as pavement management information will be collected to establish whether construction traffic could damage roads to be used for construction purposes.

Traffic Generation

Traffic generated by the dam will be determined from construction information. Traffic generated by the dam after construction might be minimal depending on activities, other than water storage, that will be allowed.

Traffic Impact

The traffic impact will be assessed during construction and after completion of construction for the normal daily traffic conditions.

The impact on travel of people in the area surrounding the dam will be assessed in relation with the road relocation programme.

The impact of increased heavy vehicular traffic on the road pavement and road structure will be assessed.

Mitigation

Mitigating measures will be proposed to minimise the impact of the dam if require.

9.2.9 Visual Impacts;

Karen James from Insite will undertake the visual impact assessment. Karen has a Bachelor's degree in Architectural Studies and an Honours degree in Landscape Architecture. She has been involved in governmental, commercial, retail and industrial development, master planning, environmental impact assessments (EIAs) and planning, as well as residential estate design projects. She works for Insite Landscape and Environmental Consultants and has compiled a number of Individual Visual Impact Assessments for previous Gautrain EIAs. These assessments were conducted over the proposed Northern and Southern Variants of the Gautrain Rapid Rail Link and included full Visual Analyses, with substantial visual graphics, Study Reports, as well as summaries for Proposed Mitigation techniques.

Basic Premises

There is a strong correlation between ecologically healthy landscapes and scenically intact landscapes and it is for this reason that the importance of the quality of our visual environment is of significant concern. At times when a 'visual resource' has to compete with the exploitation of the other resources of our country or region, or when infrastructure or development is imposed on the existing landscape, it is very often the scenic quality and character of that landscape that is diminished. It is the therefore the objective of a Visual Impact Assessment (VIA) to investigate and recommend a visual resource management system (VRM) that will identify the significance of and furthermore protect the quality of a visually positive environment.

The visual impact study is to be included to some extent in the Environmental Impact Assessment (EIA) that will focus on the proposed construction of a major dam on the farm Janetsi, an area which lies within the Groot Letaba River at the confluence of the Nwanedzi River.

A Visual Impact Assessment (VIA) will provide the project with a system of applying management policies to scenically important areas. These areas will be identified and geographically delineated according to their assessed qualitative attributes and sensitivity to viewing. Such a system will serve then as a management and decision-making tool for land managers, developers, engineers and decision-makers.

Terms of Reference

The terms of reference for this study are the following:

- Sketches and plans will be used in describing the components of the intended development as well as the study area.
- The landscape setting in which the dam development is proposed to lie will be described.
- The boundaries of the viewshed will be illustrated on a plan. This will also identify the critical surrounding land uses and view lines exposed to the view of the various structural and mechanical components.
- The change in the visual setting for each identified land use zone shall be analyzed and appropriately illustrated.
- The significance of the visual impact for each land use zone will be assessed according to a set of defined criteria.
- The impact significance for each land use zone or view line will be presented in the form of a table summary for ease of reference.
- Specific mitigation measures for each identified zone will be recommended, and their effectiveness in reducing a negative visual impact established.
- The assessment will investigate and address the visual impacts of the new dam in its various phases of construction and after its completion.

9.2.10 Noise Impacts

Derek Cosijn will undertake the noise specialist study. Derek is a professional engineer registered with the Engineering Council of South Africa (ECSA), a fellow of SAICE, a member of the Southern African Acoustics Institute (SAAI) and is a certified Environmental Assessment Practitioner (EAP). He is a partner with Jongens Keet Associates and Calyx Environmental cc. He has had 39 years of professional experience over a wide range of civil engineering, transportation planning, environmental and acoustic engineering projects. His area of special expertise is environmental noise (acoustical engineering). The environmental projects have ranged through EIAs and noise impact assessments, policy formulation and procedural guideline development. He has worked with a wide client base, ranging from the National Department of Transport, Provincial transportation/road authorities, Provincial environmental authorities, the metropolitan authorities and many local councils, to private organizations, and has also worked in Canada.

Noise Impact Assessment

i) A sufficiently detailed quantitative (by measurement) and qualitative assessment is to be undertaken within the area of influence of the planned Groot Letaba River Water Development Project (GLeWaP) in order to enable a full appreciation of the nature, magnitude, extent and implications of the potential noise impact.

ii) The noise impact assessment is to focus on the construction and operational noise impacts of proposed dams, the planned pipelines and related pump stations, and required appurtenant works.

iii) The level of investigation is to that of an environmental impact assessment (EIA).

iv) All aspects of the investigation are to conform to the requirements of relevant environmental legislation and noise standards.

v) The potential impacts of the pre-construction, construction and operational phases of the project are to be assessed.

vi) Where relevant, appropriate noise mitigating measures are to be identified. These need only be conceptual at this stage.

vii) There will be no direct involvement by the noise specialist in the public involvement programme.

9.2.11 Air quality

The air quality specialist study will be undertaken by Airshed. Reneé Thomas is an air quality consultant and has six years of experience in the field of air pollution impact assessment and air quality management. She was part of the Highveld Boundary Layer Wind Research Group based at the University of Pretoria. At Airshed Planning Professionals (previously Environmental Management Services) she has undertaken numerous air pollution impact studies and has provided extensive guidance to both industry and government on air quality management practices. She is currently completing her masters in micrometeorology. She has six years experience in conducting air quality impact assessments for a wide range of industries including: pulp and paper industries, pelletizer operations, refineries, cement operations, incinerators, chromium chemical operations, power stations, iron and steel industries, platinum industry, mining, cement industries, chlorine industries, ferro-silicon industries and fertilizer plants.

The following tasks will be undertaken:

Baseline Characterisation

Determine the regional climate and site-specific atmospheric dispersion potential, including:

- Analysis of meteorological data (from the nearest weather station to the site); and,
- Characterisation of ambient air quality and dustfall levels in the region based on available data recorded to date in the region (if available).
- Identification of the potential sensitive receptors within the vicinity of the proposed site.
- Identification of existing sources of dust emissions in area.
- The legislative and regulatory context for South Africa (also likely to include reference to the World Bank guidelines, the World Health Organisation and the European Community).

Impacts Assessment

The impacts assessment will include:

Construction Phase:

- Compilation of an emissions inventory, comprising the identification and quantification of sources of emission.
- Dispersion simulations of ambient respirable particulate concentrations and dust fallout from the construction activities for the proposed dam.
- Analysis of dispersion modelling results from both construction phases of the proposed dam, will include:
- Determine zones of maximum incremental ground level impacts (concentrations and dust fallout); and,
- Evaluation of potential for human health and environmental impacts.

Operational Phase:

A qualitative assessment of the proposed air quality due to the operation of the proposed dam.

Dust Management Plan

Development of a dust management planning component for the construction phase comprising of the following:

- Source prioritisation based on source contributions to total emissions and air quality related impact potentials;
- Identification of cost-optimised mitigation and management measures for priority sources;
- Determination of suitable timeframes, responsibilities, performance indicators and targets for selected mitigation and management measures;
- Development of a suitable ambient monitoring network, to fulfil the following functions:
- On-going characterisation of ambient air quality levels;
- Demonstrate the level of compliance with relevant air quality guidelines and standards, and deposition levels;
- Track progress of emission reductions measures being implemented; and,
- Provide early warning of adverse external impacts.

- Recommendation of emission controls and management measures to be taken into account in the project design phase in order to minimise the potential for air quality impacts.

9.3 ENVIRONMENTAL IMPACT REPORT

Once the specialist investigations have been completed and the findings and recommendations integrated by the team, an Environmental Impact Report will be prepared according to Government Notice R385, Section 32 (2) and will include the following:

- A description of the EAP who prepared the report;
- A detailed description of the proposed activity and route;
- A description of the environment that may be affected;
- A description of the PPP that was undertaken;
- A description of the need and desirability of the project and details of the alternatives that were investigated;
- Findings and recommendations of specialist studies;
- An indication of the method used to identify significance;
- A comparative assessment of all alternatives;
- An assessment of each potentially significant impact;
- An opinion of whether the activity should be authorised or not, and if is should be authorised, and conditions that should be made in respect of the authorisation;
- An Environmental Impact Statement; and
- A draft Environmental Management Plan.

9.4 ENVIRONMENTAL MANAGEMENT PLANS

Environmental Management Plans

A draft pre-construction Environmental Management Plan (EMP) and a generic construction EMP will be compiled and included in the Environmental Impact Assessment Report. The overall objective of these EMPs will be to present a workable document that explains how to operate and implement environmental protection requirements for construction. An EMP for the operational phase will not be included.

The EMP will contain and address the following aspects:

- Roles and responsibilities will be defined.
- Environmental specifications that are applicable to the project and its associated activities will be set out and will provide guidance in order to achieve these environmental specifications.
- Defining corrective actions which must be taken in the event of non-compliance with these environmental specifications.
- Specifying requirements and procedures for monitoring, auditing and reporting.
- Specifying requirements and procedures for record keeping.
- Acting as a monitoring and auditing reference tool for ensuring compliance with the provisions of the EMP.
- Making provision for review of the EMP.
- Defining how the management of the environment is reported and performance is evaluated.
- Specifying compliance with all applicable laws, regulations, standards and guidelines for the protection of the environment.

- Adopting the best practicable means available to prevent or minimise adverse environmental impacts.
- Describing all monitoring procedures required to identify impacts on the environment.
- Encouraging continual improvement of environmental performance.
- Facilitating the training of employees and contractors with regard to environmental obligations.

9.5 IMPACT ASSESSMENT METHODOLOGY

The key issues identified during the Scoping Phase informed the terms of references of the specialist studies summarised above. Each issue consists of components that on their own or in combination with each other give rise to potential impacts, either positive or negative and from the project onto the environment or from the environment onto the project. In the EIA the significance of the potential impacts will be considered before and after identified mitigation is implemented.

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

The following criteria will be used to evaluate significance:

Nature

The nature of the impact will be classified as positive or negative, and direct or indirect.

Extent and location

Magnitude of the impact and is classified as:

- **Local**: the impacted area is only at the site – the actual extent of the activity

- **Regional**: the impacted area extends to the surrounding, the immediate and the neighbouring properties.

- **National**: the impact can be considered to be of national importance.

Duration

This measures the lifetime of the impact, and is classified as:

- **Short term**: the impact will be for 0 – 3 years, or only last for the period of construction.

- **Medium term**: three to ten years.

- **Long term**: longer than 10 years or the impact will continue for the entire operational lifetime of the project.

- **Permanent**: this applies to the impact that will remain after the operational lifetime of the project.

Intensity

This is the degree to which the project affects or changes the environment, and is classified as:

- **Low**: the change is slight and often not noticeable, and the natural functioning of the environment is not affected.

- **Medium**: The environment is remarkably altered, but still functions in a modified way.

- **High**: Functioning of the affected environment is disturbed and can cease.

Probability

This is the likelihood or the chances that the impact will occur, and is classified as:

- **Low**: during the normal operation of the project, no impacts are expected.

- **Medium**: the impact is likely to occur if extra care is not taken to mitigate them.
- **High**: the environment will be affected irrespectively; in some cases such impact can be reduced.

Confidence

This is the level knowledge/information, the environmental impact practitioner or a specialist had in his/her judgement, and is rated as:

- **Low**: the judgement is based on intuition and not on knowledge or information.
- **Medium**: common sense and general knowledge informs the decision.
- **High**: Scientific and or proven information has been used to give such a judgement.

Significance

Based on the above criteria the significance of issues will be determined. This is the importance of the impact in terms of physical extent and time scale, and is rated as:

- **Low**: the impacts are less important, but may require some mitigation action.
- **Medium**: the impacts are important and require attention; mitigation is required to reduce the negative impacts
- **High**: the impacts are of great importance. Mitigation is therefore crucial.

Cumulative Impacts

The possible cumulative impacts will also be considered.

Mitigation

Mitigation for significant issues will be incorporated into the EMP for construction.

Table 9.3: Example of Impact Assessment Table

Description of potential impact		
Nature of impact		
Legal requirements		
Stage	Construction and decommissioning	Operation
Nature of Impact		
Extent of impact		
Duration of impact		
Intensity		
Probability of occurrence		
Confidence of assessment		
Level of significance before mitigation		
Mitigation measures (EMP requirements)		N/A
Level of significance after mitigation		N/A
Cumulative Impacts		
Comments or Discussion		

9.6 PUBLIC PARTICIPATION IN THE IMPACT ASSESSMENT PHASE

After the Scoping Phase, a detailed Environmental Impact Assessment will be carried out and an Environmental Impact Assessment Report (EIAR) prepared.

The purpose of the public participation process during the Impact Assessment Phase is to ensure that the Environmental Impact Assessment Report (EIAR) is made available to the public for comments. I&APs will comment on the findings of the EIA,

including the measures that have been proposed to enhance positive impacts and reduce or avoid negative ones. Once the review is completed, the authority may decide to request additional information on matters that may not be clear from the report, authorise the application with certain conditions to be complied with by the applicant or reject the application. An Environmental Authorisation reflecting the decision of the authority as well as any conditions that may apply will be issued to the applicant.

I&APs will be advised in good time of the availability of these reports, how to obtain them, and the dates and venues of public and other meetings where the contents of the reports will be presented for comment.

Public participation activities during the impact assessment phase of the EIA will revolve mainly around a review of the findings of the EIA, presented in the Draft Environmental Impact Report (EIR), a Summary Report of the Draft EIR, and the volume of Specialist Studies.

NB: The public participation process and scheduling suggested for the Impact Assessment Phase are provisional, since the Scoping Phase often points the way to the process that should be followed during the Impact Assessment Phase.

9.6.1 Progress Feedback

At the beginning of the Impact Assessment Phase (January 2008), all stakeholders on the database will receive a personalised letter to report on progress to date, to thank those who commented to date, and to outline the next steps in the process. They will again be offered the proceedings of the public meetings (held in October 2007) for their information, and will be advised that the Final Scoping Report had been handed to the authorities for approval that the Specialist Studies may proceed.

As part of the on-going communication process, every comment received from an I&AP will be responded to by way of a personalised letter of appreciation, indicating what will happen to the comment, e.g. will be taken up in the Specialist Investigations, etc. The broader body of stakeholders will continue to be informed of progress with

the Specialist Studies and the EIA and asked for their inputs on an ongoing basis up to the record of decision by the authorities.

9.6.2 Draft EIR and Summary Report

Findings of the environmental investigations will be integrated by the environmental consultants and captured in a Draft Environmental Impact Report (EIR). The report will include the Issues/Response Report, which will list every issue raised with an indication of where the issue was dealt with in the technical evaluations, and the relevant findings. It will also include a full description of the EIA process, including the necessary appendices.

A summary of the Draft EIR (probably around 25 pages) will be prepared for those I&APs that have neither the time nor the inclination to review the full EIR and the Specialist Studies. It will contain an abridged version of the full EIR, with emphasis on the findings, conclusions and recommendations. It must be noted that it is never possible in such a summary to provide the full reasoning behind all statements, findings, conclusions and recommendations. I&APs will be referred back to the full EIR report, which will be available in public places, for further information.

Announcement of opportunity to comment on findings

The availability of the Draft EIR and the Summary Report, as well as the comment period and the deadline for comment, will be announced by the following methods:

- Personalised letters to all individuals and organisations on the mailing list
- Posters at selected public places to announce the opportunity to comment
- Paid advertisements in the local and regional media
- Radio announcements on local radio stations (three languages).

Distribution

The full Draft EIR, including its Summary, the Issues and Response Report and the volume of Specialist Studies, will be left in public places (see Table 9 – same as the

public places used for the Draft and Final Scoping Reports) in the study areas where the broader public can have access to it, and will be on display at meetings with stakeholders.

Only in special cases, such as the decision-making and commenting authorities, will the full sets of reports be distributed. The Draft EIR alone, and individual Specialist Studies will, however, be distributed to stakeholders that specifically request them.

However, the Summary of the Draft EIR will be widely distributed, as follows:

- Mailed to those that request it, in the language of their choice
- Mailed to everyone registered to attend public meetings
- Be available for further distribution at the public meetings
- Personally handed to stakeholder leaders during meetings
- Be placed on the Web site.

Methods of public review

Public review of the Draft EIR will be by the following methods:

- Written comment, including email – a comment sheet asking I&APs to respond to particular questions will accompany the report; further written submissions will be encouraged
- Verbal comment during public meetings – see below
- One-on-one discussions with the EIA team members subsequent to the public meetings.

I&APs will be asked to keep the following in mind when reviewing the findings of the EIA:

- Verify that the issue(s) they have raised during the Scoping Phase have been considered in the report

- If the issue is not specifically considered in the report, verify that an indication has been provided of where and when it will be addressed

- Indicate which of the findings they agree with, and which not

- For those of the findings that they do not agree with, they will be asked to provide reasons and supporting information, or at least the sources where such information can be obtained. They are also welcome not to agree because of personal preference.

Public meetings

Similar to the scoping phase, three public meetings (table 6) will be convened to assist stakeholders to comment on the findings of the investigations.

Final EIR and its supporting reports

The Final EIR and its supporting reports will incorporate public comment received on the Draft EIR, and will be distributed mainly to the authorities and key I&APs. No summary of the Final EIR is foreseen.

Progress feedback

After the last round of public meetings, stakeholders will be informed by way of personalized letter that the Final EIR has been submitted to the authorities for decision-making, and approximately when the decisions can be expected.

9.6.3 Notification of the Environmental Authorisation

Once the authority's environmental authorisation has been issued, all stakeholders will receive a letter (within 7 days) and be advised of the appeals period, and thanked for their contributions during the environmental authorisation process.

After the Scoping Phase, a detailed Environmental Impact Assessment will be carried out and an Environmental Impact Report (EIR) prepared. This report will contain

descriptions of each feasible alternative to the process under consideration, an assessment of the environmental impacts of these alternatives, determination of the significance of the impacts, mitigation measures proposed to lessen the impacts. There will also be a section addressing the issues raised during scoping and a comparative assessment of the feasible alternatives.

The purpose of the public participation process during the Impact Assessment Phase is to ensure that the Environmental Impact Report (EIR) is made available to the public for comments. I&APs will be afforded an opportunity to verify that their issues have been considered either by the EIA Specialist Studies, or elsewhere. Also, I&APs will comment on the findings of the EIA, including the measures that have been proposed to enhance positive impacts and reduce or avoid negative ones. Once the review is completed, the authority may decide to request additional information on matters that may not be clear from the report, authorise the application with certain conditions to be complied with by the applicant or reject the application. An Environmental Authorisation reflecting the decision of the authority as well as any conditions that may apply will be issued to the applicant.

I&APs will be advised in good time of the availability of these reports, how to obtain them, and the dates and venues of public and other meetings where the contents of the reports will be presented for comment.

9.7 PROGRAMME

The EIA process commenced with a pre-application consultation with DEAT in March 2007. This was followed by a technical site visit, after which the application form was completed and submitted. The project announcement and public participation for the scoping phase took place during August 2007. The Draft Scoping Report has now been compiled and will be available for public comment from 15 September 2007 to 15 October 2007.

All the comments on the Draft Scoping Report will be considered and incorporated to produce a final Scoping Report for submission to DEAT in November 2007. Once the

DEAT has reviewed and responded to this report, the specialist studies can be concluded and the Draft Environmental Impact Assessment Report compiled.

The draft Environmental Impact Assessment Report will present the findings of the specialist studies and recommendation on how the project should be implemented to ensure environmental sustainability. This draft report will scheduled to be available for public comment in April 2008.

All the comments on the Draft Environmental Impact Assessment Report will be considered and incorporated to produce a Final Environmental Impact Assessment Report for submission to DEAT in July 2008. The DEAT will review and respond to this report by deciding whether the project can go ahead or not, and if it can, then under what conditions. This response is expected in October 2008. An appeal period will follow the authorisation.

Table 9.4: Summary of the EIA programme

Date	Activity
8 March 2007	Pre-application consultation
19 – 21 March 2007	Site Visit
22 June 2007	Application form submitted
August 2007	Scoping public participation
September/October 2007	Draft Scoping Report public comment period
November 2007	Submit Final Scoping Report
January 2008	Specialist studies and impact assessment
April – May 2008	Draft EIR and EMP public comment period
July 2008	Submit final EIR and EMP
August - October 2008	Authority Review

10. CONCLUSION AND RECOMMENDATIONS

The Environmental Scoping Studies undertaken in the Scoping phase of the Environmental Impact Assessment for the proposed Groot Letaba River Water Development Project have fulfilled the NEMA regulatory requirements and extensive measures have been taken to provide all interested and affected parties with the opportunity to participate in the identification of project alternatives and issues that require investigation.

The Scoping investigation has confirmed that the proposed project, together with supporting non-infrastructure components is the preferred option for providing improved water management to meet increased domestic, socio-economic development and ecological requirements in the catchment.

Although the studies have not identified any environmental fatal flaw issues, a number of potentially significant issues have been highlighted for further investigation in order to assess their significance, and to determine the need for the implementation of mitigation measures in order for the overall project to be environmentally sustainable. These issues are the potential impacts on:

- the quantity and quality of river flows;
- terrestrial ecology;
- social processes;
- economic processes;
- infrastructure;
- public health; and
- heritage resources.

The impacts of construction activities should also be assessed.

It is, therefore, recommended that the following specialist studies be conducted for the proposed project in the EIA Phase:

- Aquatic Ecology;
- Terrestrial Ecology;
- Heritage Resources;
- Social and Landuse processes;
- Health impacts;
- Economic processes;
- Traffic impacts;
- Noise impacts;
- Air quality impacts; and
- Visual impacts.

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