MOKOLO AND CROCODILE RIVER (WEST) WATER AUGMENTATION PROJECT (MCWAP)

Phase 1: Augment Supply from Mokolo Dam

DEA Reference Number: 12/12/20/1465

DRAFT SOCIAL IMPACT ASSESSMENT REPORT
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Prepared by:

Dr. Neville Bews & Associates
Social Impact Assessors
PO Box 145412
Bracken Gardens
1452

Submitted to:

NEMAI Consulting
Environmental & Social Consultants
147 Bram Fischer Drive
Ferndale
2194

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List of Acronyms

AIDS	Acquired immunodeficiency syndrome
CWRMA	Crocodile (West) River Management Authority
DEAT	Department of Environmental Affairs and Tourism (National)
DWA	Department of Water Affairs
DWAF	Department of Water Affairs and Forestry
EIA	Environmental Impact Assessment
HIV	Human Immunodeficiency Virus
I&AP	Interested and Affected Party
IDP	Integrated Development Plan
LLM	Laphalale Local Municipality
MCWAP	Mokolo and Crocodile River (West) Water Augmentation Project
NBA	Dr. Neville Bews & Associates
NGO	Non Governmental Organization
PA	Per Annum (Yearly)
RAP	Resettlement Action Plan
SIA	Social Impact Assessment
SMME	Small Medium and Micro Enterprises
STDs	Sexually Transmitted Diseases
TAU	Transvaal Agricultural Union
TCTA	Trans-Caledon Tunnel Authority
ToR	Terms of Reference
WHO	World Health Organisation
WDM	Waterberg District Municipality
WMA	Water Management Area
WRC	Water Research Commission
WTW	Water Treatment Works

Details and Experience of Independent Consultant

Consultant:	Dr Neville Bews & Associates
Contact person:	Neville Bews
Physical address:	84 Hennie Alberts Street, Brackenhurst Alberton
Postal address:	P O Box 145412, Bracken Gardens, Alberton, 1452
Telephone:	+27 11 867-0462
Mobile:	+27 82 557-3489
Fax:	+27 86 621-8345
Email:	bewsco@netactive.co.za
Website:	www.socialassessment.co.za

Neville Bews has consulted extensively the field of Social Impact Assessments. Some of the projects completed by Neville include the Gautrain Rapid Rail Link SIA, Australian – South African sports development programme impact, Kumba Resources Sishen South Project SIA, The United Nations Office on Drugs and Crime Evaluation of a Centre for Violence Against Women, SIAs at Leeuwpan Coal Mine Delmas, Glen Douglas Dolomite Mine Henely-on-Klip, Grootegeluk Open Cast Coal Mine, SANRAL – Social Impact of tolling the Gauteng Highway System, SANRAL – Social Impact of the N2 Wild Coast Toll Highway, University of Johannesburg – Research into research outputs of the University, the social impact assessment for Waterfall Wedge housing and business development in Midrand Gauteng, the social impact assessment for the Environmental Management Plan for Sedibeng District Municipality. Exxaro Ltd. – Social and Labour Plan for the Belfast Project, Golder Associates Africa (Pty) Ltd – SIA for the Transnet New Multi-Product Pipeline (Commercial Farmers); Golder Associates Africa (Pty) Ltd – SIA for the Proposed Vale Moatize Power Plant Project in Mozambique. Kumba Resources Ltd – SIA for the Proposed Dingleton Resettlement Project at Sishen Iron Ore Mine; EcoPartners – SIA for Gold Fields West Wits Project. Exxaro Resources Ltd. – SIA for the Belfast Project. KV3 Engineers – SIA for Eskom Holdings Ltd's Proposed Ubertas 88/11kV Substation. SIA for the N3 Toll Road Route Location Initiative – Tugela Plaza to Warden.

Neville regularly lectures as a guest lecturer in the Department of Sociology at both the Universities of Johannesburg and Pretoria. At the University of Johannesburg he collaborated with Prof. Henk Becker of Utrecht University, the Netherlands, in a joint

lecture to present the Social Impact Assessment masters course via video link between the Netherlands and South Africa. Neville has also presented papers on Social Impact Assessments at both national and international seminars and has published widely at both a national and international level.

Declaration of Consultant's Independence

Dr. N. F. Bews is an independent consultant to Nemai Consulting and has no business, financial, personal or other interest in the activity, application or appeal in respect of which he was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances whatsoever that compromise the objectivity of this specialist performing such work.

Executive Summary

Various developments within the Lephalale region of Limpopo, which include Eskom's Medupi Power Station and the associated expansion at Exxaro's Grootegeluk Coal Mine, have resulted in an increased demand for water in the region. Consequently the Department of Water Affairs commissioned the Mokolo Crocodile (West) Water Augmentation Project to establish how these demands could best be met within a short time frame. Towards this end, the infrastructure options considered as a means of augmenting the water supply to the Lephalale, include:

1. *De-bottlenecking* an existing pipeline, currently owned by Exxaro;
2. *Phase 1 of an augmentation process* from Mokolo Dam; and
3. *Phase 2, t*o introduce a transfer scheme from the Crocodile River (West) to the Lephalale area.

To assess the environmental impact of Phase 1 of the project an environmental impact assessment was undertaken by Nemai Consulting of which this social impact assessment forms part. The study employed a multi-faceted methodological technique to scope the base line social environment within which the project will unfold and to identify and assess the likely social impacts of the project across both the construction and operational phases. In this manner the following impacts were identified and assessed in accordance with a recognised impact assessment technique.

- Access issues
- Crime and security
- Disturbance of Cultural, Spiritual and Religious Sites
- Dust and Pollutants
- Economic Effects on a Cumulative Basis
- Fencing
- Fire hazards
- Impact on Farming Operations
- Job Creation
- Noise
- Relocation
- Sense of Place
- Services Infrastructure and Provisions
- SMME opportunities
- STDs, HIV and AIDS Risk
- Social Stability
- Traffic Disruption During Construction and Maintenance
- Do Nothing Alternative

In respect of these impacts, it was found that 3 were positive and fifteen were negative and that all of the negative impacts can, to a greater or lesser degree, be mitigated in an effort to reduce their effect. Of the 3 positive impacts one, the economic effect on a cumulative basis, was associated with the operational phase of the project and as such is considered to be of a long-term, and possibly even of a permanent nature. Although this impact is addressed at a more in-depth level in the economic report the social consequences of this impact are also noted in the social impact assessment due to their importance in respect of this project. The remaining 2 positive impacts, job creation and small medium and micro enterprise opportunities, are mainly associated with the construction phase of the project.

Of the fifteen negative impacts, on an overall basis, these too will have a much greater effect during the construction phase of the project. During construction the issues of access across construction sites, the risk of the spread of STDs, HIV and AIDS and impact on farming operations are probably the most significant negative impacts of the project, apart from the do nothing alternative.

Considering the do nothing option, it is quite clear that if nothing is done and if the project does not proceed there are likely to be significant and severe social impacts on a regional and national basis. These impacts are associated with increased risk to the security of water at a regional level and the supply of electricity at a national level. It is important, however, to consider these risks in the light of any uncertainty regarding access to water, that the project may create for communities living downstream of the dam and to balance the regional and national interests against the rights and interests of these affected communities.

1. Introduction

Dr. Neville Bews & Associates have been sub-contracted by Nemai Consulting to undertake a Social Impact Assessment (SIA) for Phase 1 of the Mokolo and Crocodile River (West) Water Augmentation Project (MCWAP). This project has become necessary due to various developments within the Lephalale region, which rely on water supplies from the Mokolo catchment area. Amongst these developments are the construction of the Medupi Power Station and the associated expansion of Exxaro's Grootegeluk coal mining operation, together with other consequential secondary and tertiary developments, all of which have resulted in an urgent need for the augmentation of water supply to the area. Apart from these developments, there is also a strong possibility that future expansion will include the construction of additional power stations, the commencement of operations by the petro-chemical industries in the region and the accompanying accelerated population growth. All of these developments are driven by the presence of extensive coal reserves in this district and are likely to result in a sharp increase in water requirements.

2. Project Description

Consequently the Department of Water Affairs (DWA) commissioned the Mokolo Crocodile (West) Water Augmentation Project (MCWAP) to establish how these demands can best be met within a very challenging timeframe. Towards this end, the infrastructure options considered as a means of augmenting the water supply to the Lephalale area, include:

4. *De-bottlenecking* an existing pipeline, currently owned by Exxaro;
5. *Phase 1 of an augmentation process* from Mokolo Dam; and
6. *Phase 2, t*o introduce a transfer scheme from the Crocodile River (West) to the Lephalale area.

De-bottlenecking the existing Exxaro pipeline, which stretches from Mokolo Dam to Lephalale, entails the construction of the first 9km of the proposed underground gravity pipeline (for Phase 1) from Wolvenfontein balancing dam, with interconnections to the existing pipeline. The intention of the de-bottlenecking is to improve the hydraulic gradient at Rietspruitnek, where the existing pipeline passes over a high point.

Phase 1 consists of an underground pipeline parallel to the existing pipeline, to augment the supply from Mokolo Dam. This is to supply the growing water requirement and also to supply more water for the interim period until a transfer pipeline from the Crocodile River (West) can be implemented. The system will utilise the available yield from Mokolo Dam and consists of the following:

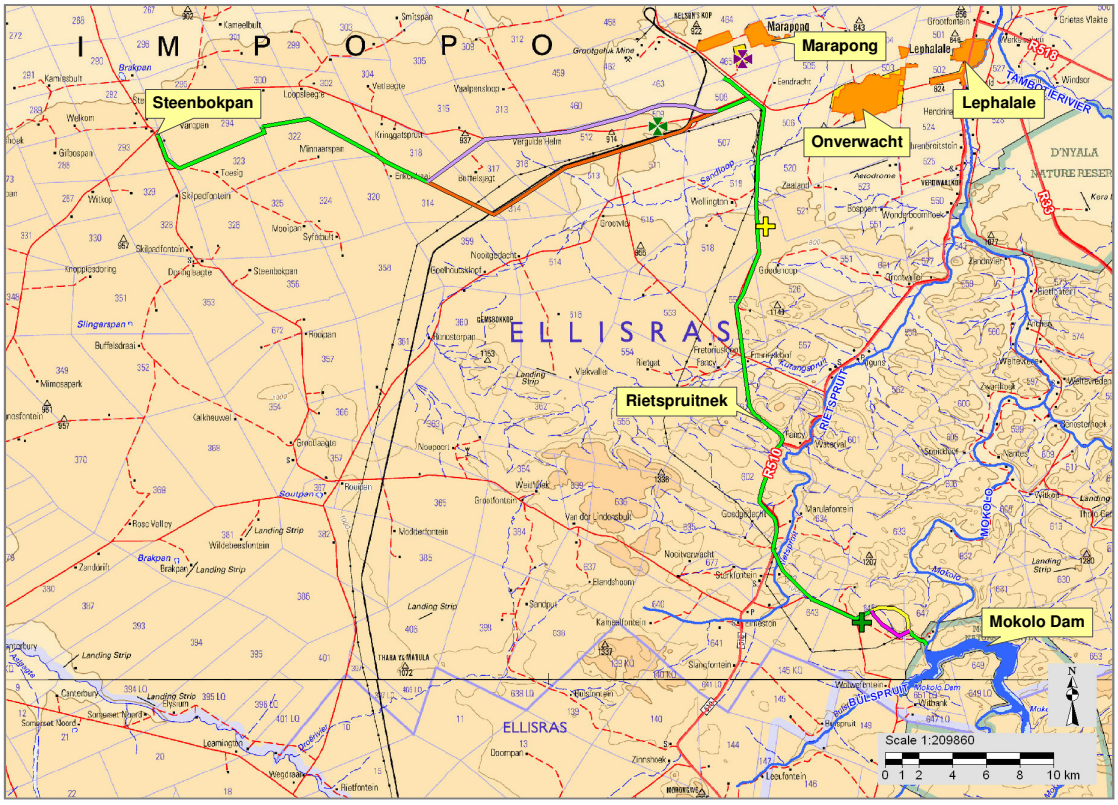
- Rising main from Mokolo Dam to Wolvenfontein balancing dam;
- Gravity line from Wolvenfontein to Matimba Power Station;
- Gravity line from Matimba Power Station to Steenbokpan; and
- Break pressure tank at Rietspruitnek.

Phase 2 entails the construction of a transfer scheme from the Crocodile River (West) at Vlieëpoort, near Thabazimbi, to the Lephalale area via the system and will consist of:

- A weir and abstraction infrastructure, including a balancing dam, desilting works, and a high lift pumpstation at Vlieëpoort (near Thabazimbi);
- Transfer system (approximately 100 km of underground pipeline): consisting of various alternative pipeline routes;
- A Break Pressure Reservoir;
- An Operational Reservoir; and a
- Delivery system, consisting of alternative routes for a gravity pipeline (underground) running from the Operational Reservoir to the Steenbokpan area, connecting to the Phase 1 works

A locality map of the project is provided in Figure 2 - 1 below

Figure 2 - 1: Locality map of the MCWAP



Although the project is regarded as a single project, three separate environmental assessments are being undertaken for the three sub-components one each for Phase 1, Phase 2 and the De-bottlenecking of MCWAP. The focus of this SIA Report is on Phase 1 of the MCWAP.

3. Terms of Reference

The terms of reference of the study were to:

- Conduct a review of available data, including Statistics SA data, various reports generated for the MCWAP and documentation compiled during the public participation process. To use this data to compile a baseline social profile in the study area;
- Identify potential social impacts during both the construction and operational phases of the proposed project;
- Recommend appropriate optimisation measures to maximise positive impacts and mitigation measures to avoid or minimise the severity of the identified negative impacts.

Issues excluded from this study and dealt with in other specialist reports are:

- The broader economic impacts associated with the project;
- Potential impacts of the project on property values;
- An assumption was made that data provided by Nemai Consulting was a correct reflection of the EIA process to this point.

4. Methodology

A mixed quantitative and qualitative methodological approach, based on data sourced from Statistics South Africa, the comments and response report, various specialist reports and document scans, are used to gather information throughout the study. The impact assessment technique applied to achieve this is described in some detail below.

4.1. Data Collection Methods

Data was gathered through:

- A comprehensive scan of the Draft Comments and Response Report.
- An intensive review of maps and aerial photographs of the routes.
- Interviews and discussions with the Public Participation Consultant.
- Interviews and discussions with the Environmental Impact Assessment Consultants.
- A literature review of various documents such as the relevant municipal Integrated Development Plans (IDPs) and other specialist reports and documents.
- Statistics South Africa, Census 2001; Community Survey 2007; Mid-year population estimates; Quarterly Labour Force Survey 2010.
- Municipal Demarcation Board.
- A broader literature scan.

4.2. Assessment Technique

The assessment criteria used to evaluate the impacts of the various route alternatives of the Mokolo and Crocodile River (West) Water Augmentation Project are as follows.

A description of when the impact is likely to occur during the project, namely during planning, implementation construction, operation or the decommissioning phase;

A description of the status of the impact: Specifically whether the impact will have a negative (cost), positive (benefit) or neutral effect;

The degree of confidence of predictions: based on the availability of information and specialist knowledge according to the following criteria:

- **Very confident:** >70% sure of impact prediction;
- **Fairly confident:** Between 35 – 70% sure of impact prediction;
- **Uncertain** <35% of impact prediction;

The significance of an impact: will be measured by assessing the following criteria:

- **SCALE**
  - **Local**: Within the local municipal area;
  - **Regional**: Province;
  - **National**: South Africa; or
  - **International**: Outside the South African borders.
- **RELEVANCE**
  - **Irrelevant:** Changes are not perceivable;
  - **Moderately relevant:** Changes can be observed and/or measured but do not result in loss or enhancement of environmental quality;
  - **Relevant**: Changes can be observed and/or measured characterising losses/enhancement of environmental quality; or
  - **Very Relevant:** Changes can be observed and/or measured characterising expressive losses/enhancement of environmental quality.
- **DURATION**
  - **Short:** 0 – 5 years
  - **Medium:** 5-15 years
  - **Long:** Impact ceases after operational life of power plant
  - **Permanent:** Impact continues even after the power plant has been decommissioned.
- **REVERSIBILITY**
  - **Reversible:** Once the project has been decommissioned, the area impacted is able to return back to its original state or back

to a similar state as it existed before the impact took place.

- **Irreversible:** Whereby, even if the power plant is decommissioned, the environment remains affected despite environmental control and/or mitigation measures being implemented.

- **PROBABILITY**
  - **Highly unlikely:** Expected to never happen.
  - **Unlikely:** Has not happened yet but could happen once in the lifetime of the project. There is a possibility the impact could occur.
  - **Almost certain:** It is most likely that the impact will occur.
  - **Definite:** The impact will occur regardless of the implementation of any preventative or corrective actions.

Significance rating: The significance of an impact is described in terms of the following impact significance ratings.

- **Low:** The impact will not have an influence on the environment or require to be significantly accommodated in the project design
- **Medium:** The impact could have an influence on the environment which will require modification of the project design or alternative mitigation; or
- **High:** The impact could have a 'no-go' implication on the project regardless of any possible mitigation.

Recommended management actions:

- Mitigation objectives outlining the level of mitigation that should be achieved;
- Recommended mitigation/optimisation action;

Issues concerning the limitations of the study will now be addressed.

4.3. Study Limitations and Assumptions

The data currently available from Statistics South Africa carries with it certain limitations that will be reflected in this study. Although updated demographic data is available from Stats SA in the form of the Community Survey 2007 and the Mid-year population estimates, this data does not reach down to the ward level and at that level the only

data available from Stats SA was that gathered during Census 2001, being the most recent Census undertaken in South Africa.

Every attempt was made to gather data from a wide range of sources, however, much of the data in this report was made available by the Environmental Impact Assessment (EIA) consultants, Nemai Consulting, and relies on the accuracy of the data made available by Nemai Consulting. It must also be noted that the results of this study cannot be generalised and applied to the entire population across the whole area and, as is in the nature of social research, is restricted to the specific study area. Attention is now turned towards providing a demographic description of the study area.

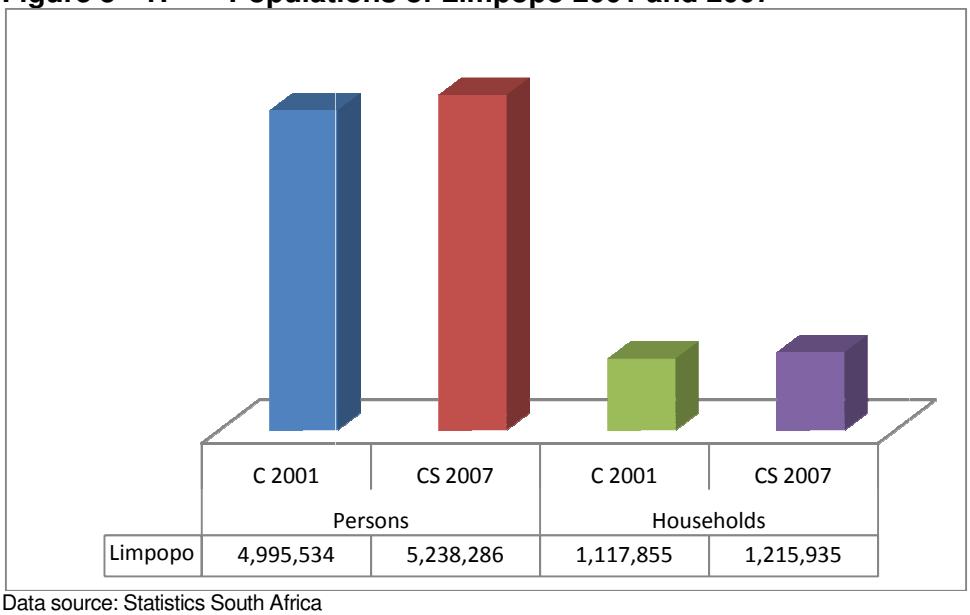
5. Demographic Description of the Area

The MCWAP falls within the province of Limpopo in South Africa and more specifically within the Waterberg District Municipality and the Lephalale Local Municipality. Each of these areas is discussed below with attention being placed at the municipal levels.

5.1. Provincial Description

The province of Limpopo covers an area of 122 839.37 km^2 accounting for some 10.2% of the land mass of South Africa and by 2009 the province accommodated 10,6% of the population of the entire country (Statistics South Africa, 2009, p. 4). In 2007, the population of Limpopo was estimated at 5 238 286 people distributed within 1 215 935 households (Statistics South Africa, 2007, p. 13). By 2009 it was estimated that Limpopo would have experienced a nett out migration rate of some -189 200 people as people seek employment elsewhere in the country. Thus the medium variant estimates place the population of Limpopo at some 5,23 million in 2009, marginally under than the 2007 estimates (Statistics South Africa, 2009, p. 12). The population of Limpopo is graphically illustrated through the bar chart in Figure 5 - 1 below which indicates both the Census 2001 as well as the Community Survey 2007 data. This is done in respect of both persons and households in Limpopo.

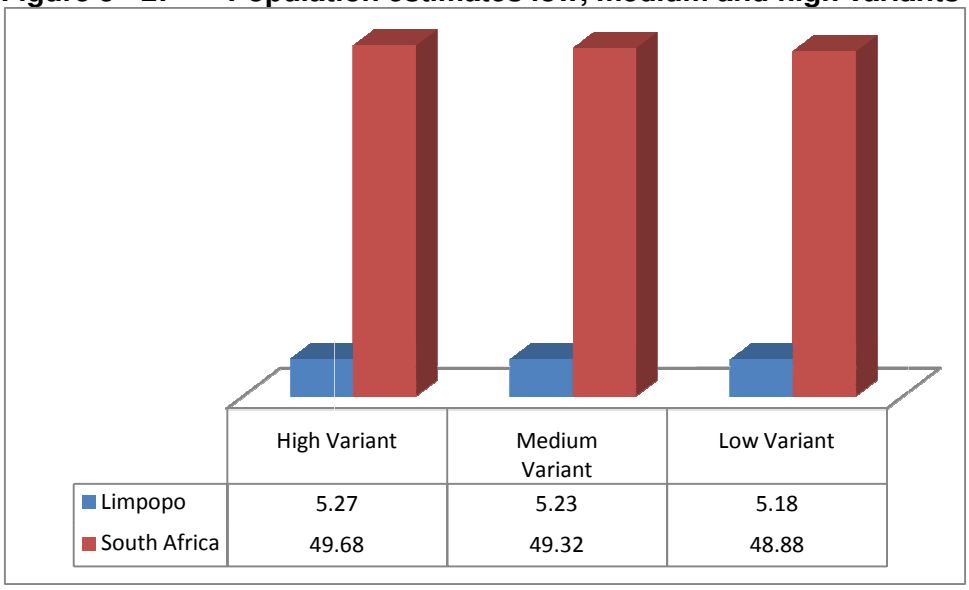
Figure 5 - 1: Populations of Limpopo 2001 and 2007



Data source: Statistics South Africa

The population estimates of Limpopo are displayed in millions across all variants and compared to those of South Africa in Figure 5 - 2 below.

Figure 5 - 2: Population estimates low, medium and high variants (millions)

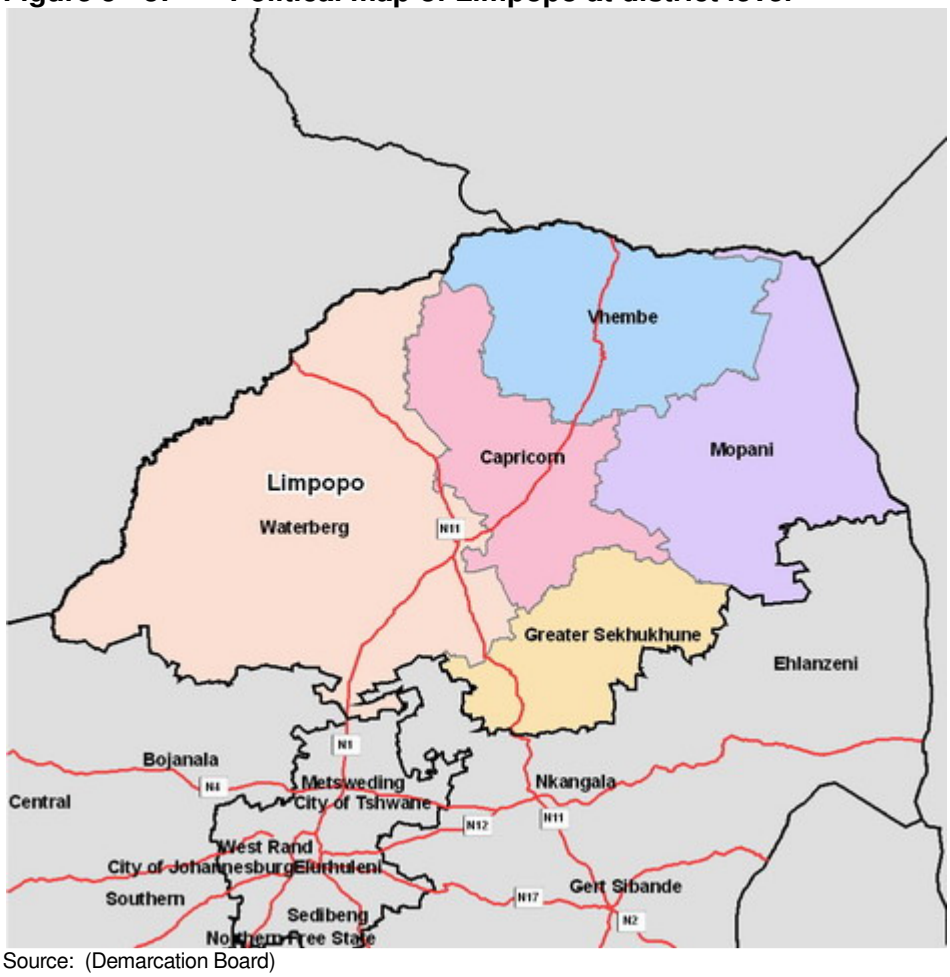


Data source: Statistics South Africa

At the political level, the province consists of the 5 district municipalities of Mopani DC33; Vhembe DC34; Capricorn DC35; Waterberg DC36 and Greater Sekhukhune DC47. There are 23 local municipalities shared across these 5 district municipalities.

The district municipalities in Limpopo are illustrated in the political map provided in Figure 5 - 3 below.

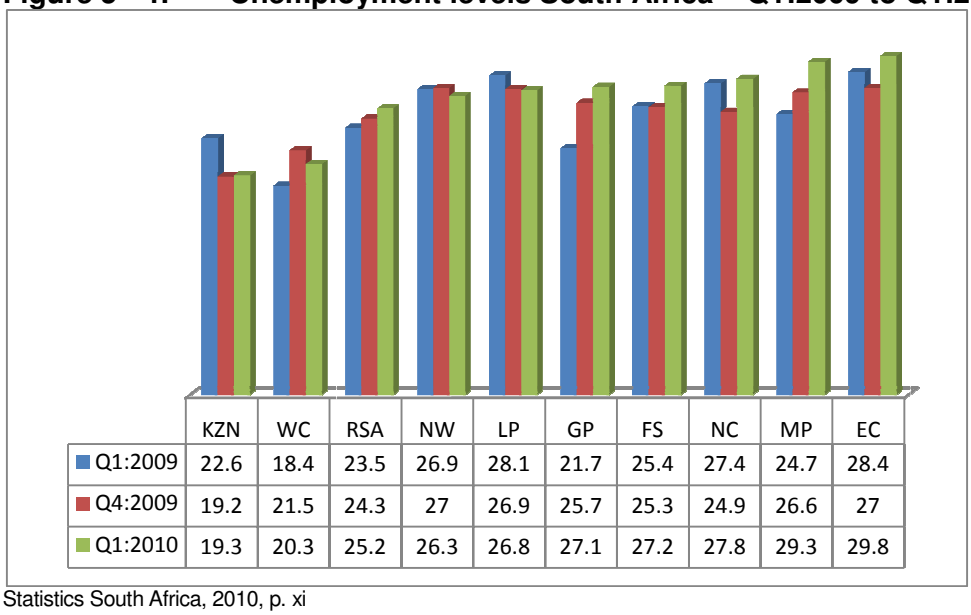
Figure 5 - 3: Political map of Limpopo at district level



Source: (Demarcation Board)

A comparison of the unemployment figures for Limpopo and South Africa indicates that Limpopo, with an unemployment rate of 26,8% in the 1st Quarter of 2010, has a higher level of unemployment than was generally the case across South Africa. Only three provinces, Kwazulu-Natal (19.3%), Western Cape (20.3%) and North West (26.3%) show lower levels of unemployment than Limpopo (Statistics South Africa, 2010, p. xi). This data is represented below across Quarter 1, 2009 and Quarter 1, 2010, through the bar chart in Figure 5 - 4 below.

Figure 5 - 4: Unemployment levels South Africa – Q1:2009 to Q1:2010



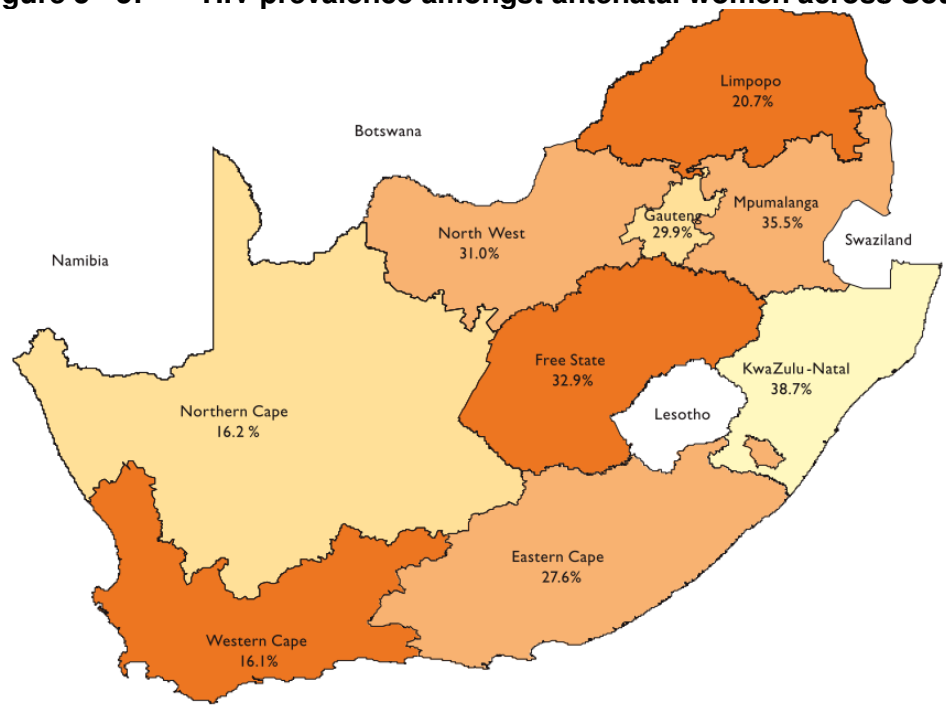
	KZN	WC	RSA	NW	LP	GP	FS	NC	MP	EC
Q1:2009	22.6	18.4	23.5	26.9	28.1	21.7	25.4	27.4	24.7	28.4
Q4:2009	19.2	21.5	24.3	27	26.9	25.7	25.3	24.9	26.6	27
Q1:2010	19.3	20.3	25.2	26.3	26.8	27.1	27.2	27.8	29.3	29.8

Statistics South Africa, 2010, p. xi

It is important to note, in discussing unemployment levels in this study, that Statistics South Africa's official definition of unemployment is used. This definition only includes amongst the unemployed, those persons between 15 – 64 years who, "[*a]ctively looked for work or tried to start a business in the four weeks preceding the survey interview*" (Statistics South Africa, 2010, p. xvi). This definition is the narrow definition of unemployment and, as such, excludes those discouraged work seekers who may no longer have been actively looking for work but who remained unemployed and disillusioned.

The HIV prevalence rate amongst antenatal women, in Limpopo is at 20.7% placing the province amongst those areas of the country with a lower HIV prevalence rate, although above the respective 16.1% and 16.2% of the Western and Northern Cape provinces. A more project specific discussion concerning HIV and AIDS follows when addressing when discussing demographics at the district and municipal levels The map provided in Figure 5 - 5 illustrates the prevalence of HIV amongst antenatal women across South Africa.

Figure 5 - 5: HIV prevalence amongst antenatal women across South Africa



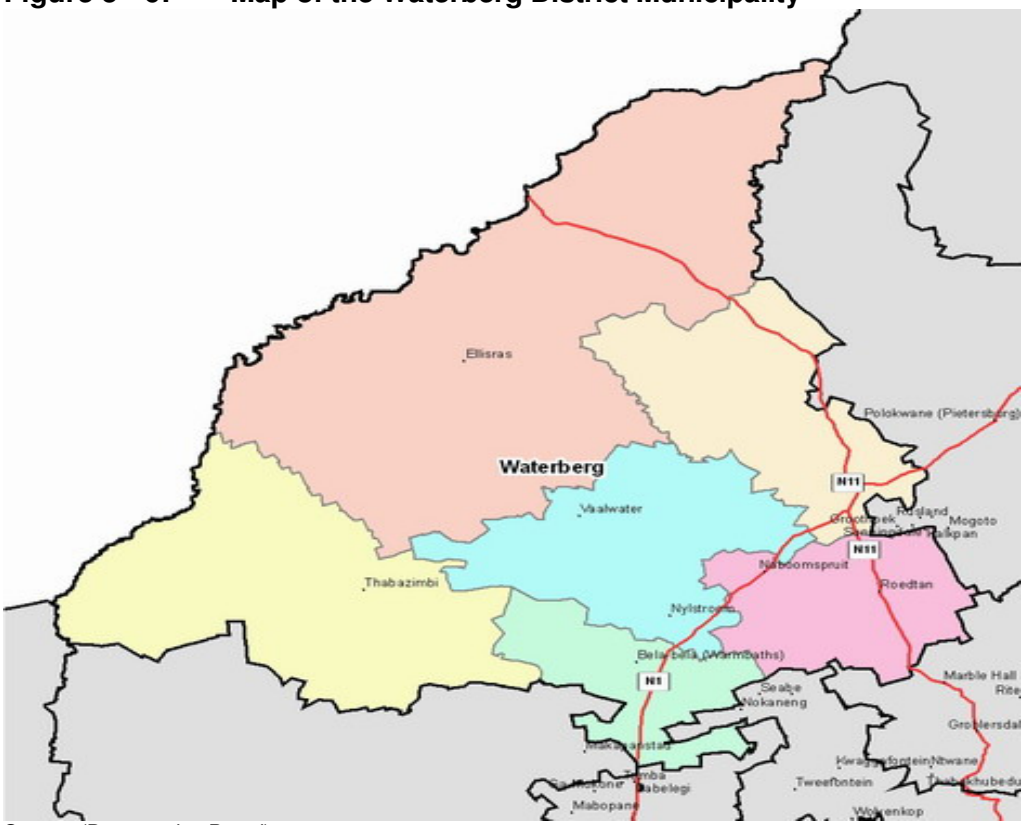
Source: (Department of Health, 2009, p. 9).

Attention is now placed on the municipal levels and, under the next section of the report a comparison of some of the more significant demographical indicators within Limpopo and the district of Waterberg are compared to those in the local municipality of Lephalale.

5.2. Municipal Description

At a district level the Mokolo and Crocodile River (West) Water Augmentation Project falls within the Waterberg District Municipality which is the largest district in the province of Limpopo, covering a geographical area of 49 518.81 km^2. The district includes the 6 local municipalities of Mogalakwena (LIM367); Bela-Bela (LIM366); Modimolle (LIM365); Mookgopong (LIM364); Lephalale (LIM362) and Thabazimbi (LIM361). The Waterberg District Municipality is illustrated by the map in Figure 5 - 6.

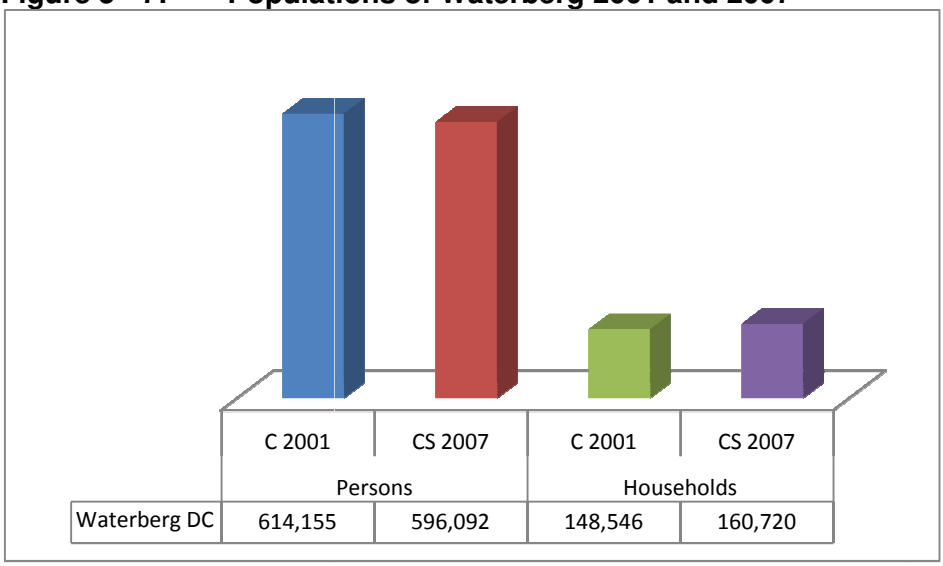
Figure 5 - 6: Map of the Waterberg District Municipality



Source: (Demarcation Board)

The population of the Waterberg district was placed at 596 092 within 160 720 households in 2007 (Statistics South Africa, 2007, p. 13) and at 644,642 in the economic report (Conningarth Economists, 2010, p. 76). A comparison of the Waterberg population in respect of Census 2001 and Community Survey 2007 data is made below in Figure 5 - 7

Figure 5 - 7: Populations of Waterberg 2001 and 2007

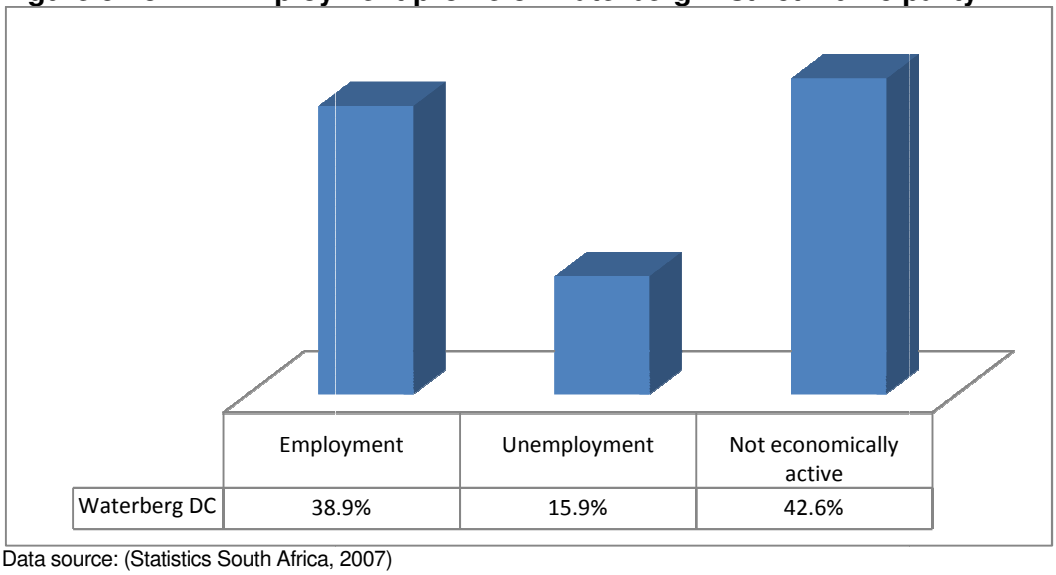


Data source: (Statistics South Africa, 2007)

As the Mid-year Population Estimates for 2009 only apply at the national and provincial levels no estimation can be made, based on data available from Statistics South Africa, relating to Waterberg for 2009. However, the economic report places the population of Waterberg at 100 787 in 2010 and estimates a population growth rate of 0.53% (Conningarth Economists, 2010, p. 79)

The Quarterly Labour Force Survey, 2010 also only applies at a national and provincial level, consequently the most recent employment data, at a municipal level, is that sourced through the Community Survey, 2007. According to Community Survey, 2007, the Waterberg District Municipality had a relatively low unemployment rate, at 15.9%, as indicated in Figure 5 - 8 below.

Figure 5 - 8: Employment profile of Waterberg District Municipality

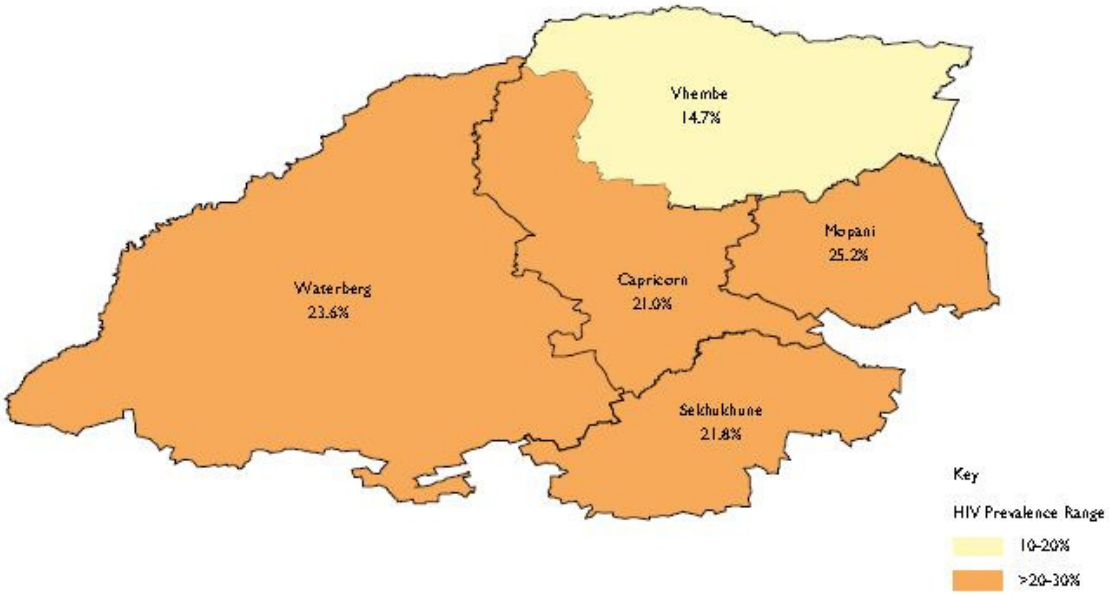


Data source: (Statistics South Africa, 2007)

A more comprehensive comparison of unemployment data across the provincial, district and local levels is provided in Table 5 - 1 on page 18 below.

Although data collected during the 2008 National Antenatal Sentinel HIV & Syphilis Prevalence Survey (Department of Health, 2009) does not extend beyond the district municipal levels, it does provide some indication of the HIV status across the province. As Figure 5 - 9 indicates, in Limpopo Waterberg has the second highest HIV prevalence rate at 23.6%, only being exceeded by Mopani District Municipality at 25.2%. With a rate of 14.7% the district municipality of Vhembe has the lowest HIV prevalence level in Limpopo.

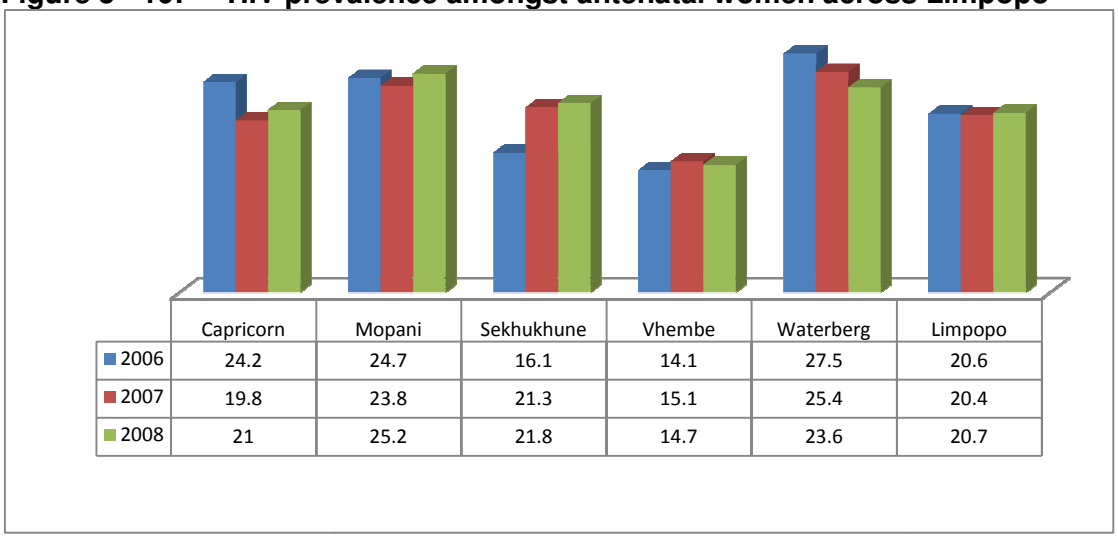
Figure 5 - 9: HIV prevalence amongst antenatal women across Limpopo.



Source: (Department of Health, 2009, p. 26).

The fluctuations in the HIV prevalence rate across Limpopo between 2006 and 2008 indicate that the Waterberg region experienced its highest prevalence rate of HIV amongst antenatal women in 2006, when it was at 27.5%. This data is illustrated in Figure 5 - 10 below.

Figure 5 - 10: HIV prevalence amongst antenatal women across Limpopo

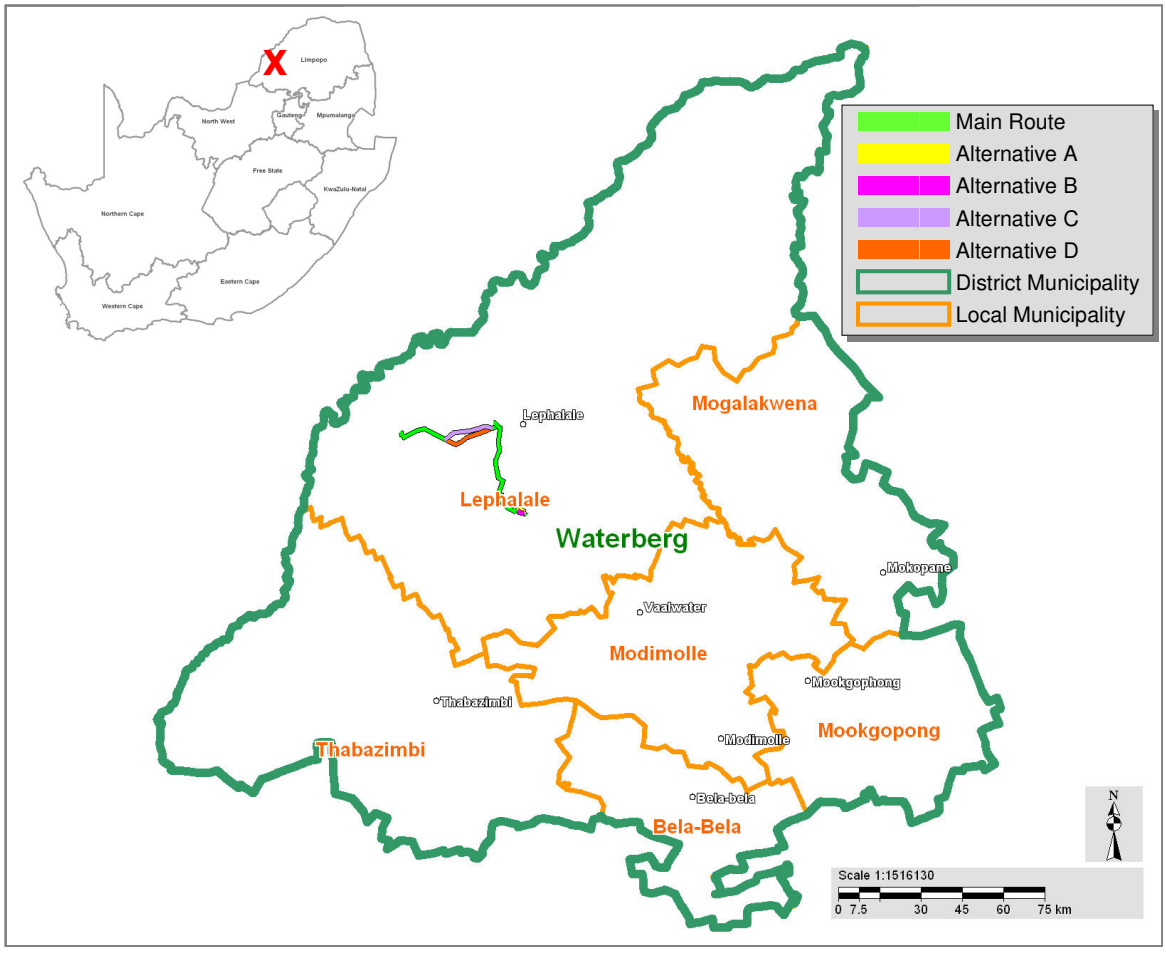


	Capricorn	Mopani	Sekhukhune	Vhembe	Waterberg	Limpopo
2006	24.2	24.7	16.1	14.1	27.5	20.6
2007	19.8	23.8	21.3	15.1	25.4	20.4
2008	21	25.2	21.8	14.7	23.6	20.7

(Department of Health, 2009, p. 26)

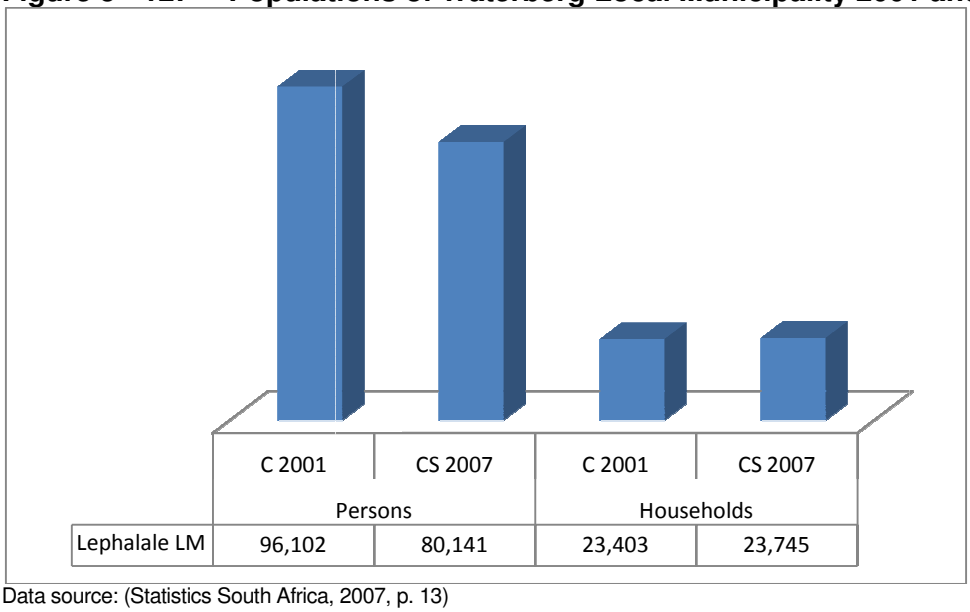
The MCWAP falls within the Lephalale Local Municipality as illustrated by means of the location map in Figure 5 - 11 below.

Figure 5 - 11: Location map of the MCWAP



According to Community Survey 2007 (Statistics South Africa, 2007, p. 13) the local municipality of Lephalale had a population of 80 141 people within 23 745 households. The economic report (Conningarth Economists, 2010, p. 79) places the population of Lephalale at 100 787 in 2010. Census 2001 and Community Survey, 2007, in respect of the population of Lephalale, are compared in Figure 5 - 12 below.

Figure 5 - 12: Populations of Waterberg Local Municipality 2001 and 2007

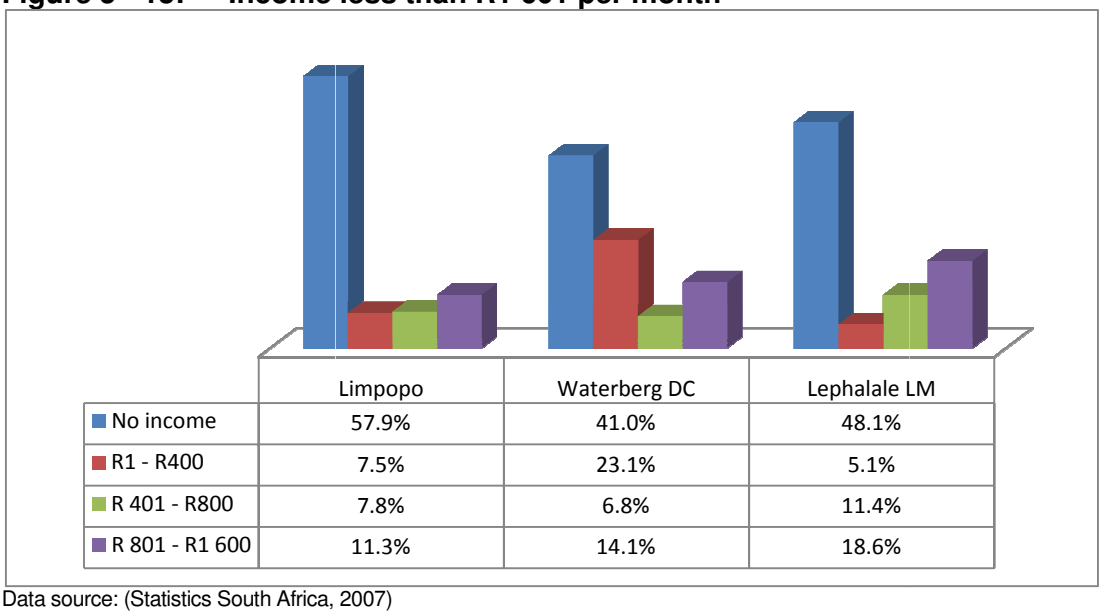


Data source: (Statistics South Africa, 2007, p. 13)

Various socio-economic indicators, available from Statistics South Africa through Community Survey 2007, are now compared across the province of Limpopo, the district of Waterberg and the Lephalale Local Municipality.

Black people dominate the population groups within the area with Limpopo having the highest percentage at 97.47% and within Limpopo the district of Waterberg the lowest at 90.66%. The second highest population group is white people at 8.38% in Waterberg and 5.96% in Lephalale with only 2.19% of the population comprising of white people in Limpopo. On a gender basis there is a higher percentage of females to males across all areas with Waterberg having the closest female to male ratio at 51.08:48.92 percent and Limpopo the widest with a ratio of 53.82:46.18 percent. While 57.92% of the people between the ages of 15 and 65 years have no income in Limpopo this figure is reduced to 48.06% and 41% in Lephalale and Waterberg respectively. The lower end income profile of the region is illustrated in Figure 5 - 13 below.

Figure 5 - 13: Income less than R1 601 per month

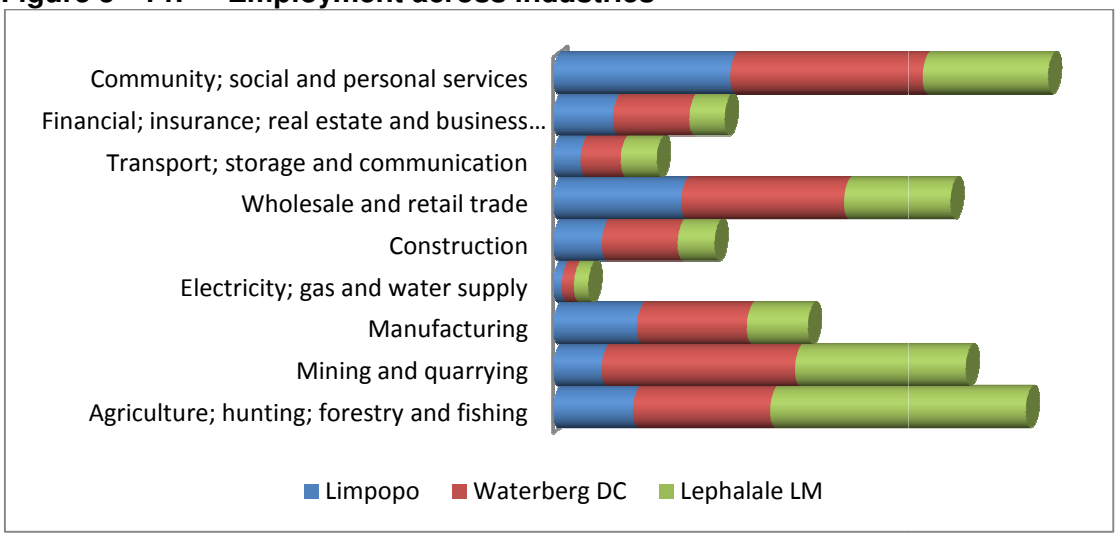


	Limpopo	Waterberg DC	Lephalale LM
No income	57.9%	41.0%	48.1%
R1 - R400	7.5%	23.1%	5.1%
R 401 - R800	7.8%	6.8%	11.4%
R 801 - R1 600	11.3%	14.1%	18.6%

Data source: (Statistics South Africa, 2007)

Although the community, social and personal services are prominent, in terms of employment across Limpopo and Waterberg at 5.59% and 6.10% respectively, Limpopo has somewhat of a more even distribution of employment across a wider range of industries. Apart from this Waterberg show a bias towards mining and quarrying at 6.09% and Lephalale towards Agriculture, hunting, forestry and fishing at 8.09% and mining and quarrying at 5.40%. This data is illustrated in Figure 5 - 14 below.

Figure 5 - 14: Employment across industries



A more comprehensive comparison of data, across the study area as discussed above, is provided below through Table 5 - 1.

Table 5 - 1: Demographic data Limpopo, Waterberg, Lephalale

Population Group	Limpopo		Waterberg DC		Lephalale LM	
Black	5,105,894	97.47%	540,446	90.66%	75,352	94.02%
Coloured	9,456	0.18%	1,730	0.29%	9	0.01%
Indian or Asian	8,248	0.16%	3,936	0.66%	0	0.00%
White	114,709	2.19%	49,982	8.38%	4,780	5.96%
Gender						
Male	2,418,865	46.18%	291,635	48.92%	38,856	48.48%
Female	2,819,421	53.82%	304,455	51.08%	41,285	51.52%
Income - 15-65 years						
No income	1,730,905	57.92%	244,388	41.00%	22,935	48.06%
R1 - R400	223,634	7.48%	137,600	23.08%	2,441	5.12%
R401 - R800	232,794	7.79%	40,666	6.82%	5,418	11.35%
R801 - R1 600	338,710	11.33%	83,765	14.05%	8,872	18.59%
Industry						
Agriculture; hunting; forestry and fishing	75,604	2.53%	15,684	4.32%	3,859	8.09%
Mining and quarrying	46,161	1.54%	22,103	6.09%	2,578	5.40%
Manufacturing	79,286	2.65%	12,570	3.46%	918	1.92%
Electricity; gas and water supply	8,262	0.28%	1,364	0.38%	210	0.44%
Construction	46,209	1.55%	8,643	2.38%	553	1.16%
Wholesale and retail trade	121,020	4.05%	18,615	5.13%	1,610	3.37%
Transport; storage and communication	26,082	0.87%	4,581	1.26%	539	1.13%
Financial; insurance; real estate & business services	56,630	1.89%	8,716	2.40%	530	1.11%
Community; social and personal services	167,159	5.59%	22,128	6.10%	1,885	3.95%
Institution attended 5-24 Years						
Pre-school	82,239	3.31%	8,341	3.30%	1,442	4.12%
Primary school	931,913	37.48%	90,323	35.79%	12,633	36.11%
Secondary school	921,421	37.06%	85,595	33.91%	11,515	32.92%
College	20,560	0.83%	2,351	0.93%	517	1.48%
University/University of technology/Technikon	23,143	0.93%	1,498	0.59%	185	0.53%
Labour status						
Employed	818,816	27.40%	141,170	38.91%	16,273	34.10%
Unemployed	554,563	18.56%	57,570	15.87%	7,361	15.43%
Not economically active	1,522,803	50.96%	154,514	42.59%	22,949	48.09%

(Statistics South Africa, 2007)

Moving on to service delivery indicators, the Waterberg district has the highest level of service delivery with respect to access to water, electricity delivery, refuse removal, and access to a flush toilet connected to the sewerage system. These services are, to a large degree, also available throughout Lephalale but, to a somewhat lesser degree, across the rest of Limpopo. However, at 79.67%, Limpopo has the highest percentage of people living in house or brick structures on separate stands and the highest number of households living in properties that they have been fully paid for. This data is compared across the entire study region by means of Table 5 - 2 below.

Table 5 - 2: Demographic data, local municipalities

Population Group	Limpopo		Waterberg DC		Lephalale LM	
Access to water						
Piped water inside the dwelling	219,369	18.04%	55,618	34.61%	7,350	30.96%
Piped water inside the yard	310,655	25.55%	36,421	22.66%	2,787	11.74%
Piped water from access point outside the yard	486,982	40.05%	49,223	30.63%	10,214	43.02%
Borehole	80,503	6.62%	14,456	8.99%	3,095	13.03%
Energy for lighting						
Electricity	987,417	81.21%	135,595	84.37%	20,305	85.51%
Gas	1,177	0.10%	142	0.09%	7	0.03%
Paraffin	40,044	3.29%	3,715	2.31%	311	1.31%
Candles	172,429	14.18%	20,699	12.88%	3,029	12.76%
Solar	8,304	0.68%	181	0.11%	64	0.27%
Post facilities						
Yes	303,022	24.92%	42,645	26.53%	5,435	22.89%
No	908,467	74.71%	117,384	73.04%	18,189	76.60%
Refuse disposal						
Removed by local authority/private company 1 a week	214,602	17.65%	58,619	36.47%	6,126	25.80%
Removed by local authority/private company less often	13,980	1.15%	4,199	2.61%	199	0.84%
Communal refuse dump	16,318	1.34%	1,574	0.98%	178	0.75%
Own refuse dump	801,800	65.94%	78,578	48.89%	17,175	72.33%
No rubbish disposal	167,431	13.77%	17,666	10.99%	66	0.28%
Tenure status						
Owned and fully paid off	889,490	73.15%	103,538	64.42%	13,874	58.43%
Owned but not yet paid off	41,378	3.40%	5,406	3.36%	1,325	5.58%
Rented	104,687	8.61%	33,208	20.66%	6,780	28.55%
Occupied rent-free	177,370	14.59%	18,035	11.22%	1,765	7.43%
Toilet facilities						
Flush toilet (connected to sewerage system)	216,740	17.82%	67,615	42.07%	7,210	30.36%
Flush toilet (with septic tank)	21,803	1.79%	3,955	2.46%	655	2.76%
Dry toilet facility	40,986	3.37%	6,961	4.33%	1,445	6.09%
Pit toilet with ventilation (VIP)	122,656	10.09%	8,797	5.47%	1,236	5.21%
Pit toilet without ventilation	661,490	54.40%	65,010	40.45%	11,745	49.46%
Chemical toilet	1,171	0.10%	256	0.16%	0	0.00%
Type of main dwelling						
House or brick structure on a separate stand/yard	968,696	79.67%	116,939	72.76%	16,466	69.35%
Traditional dwelling/structure of traditional materials	108,954	8.96%	5,470	3.40%	1,072	4.51%
Flat in block of flats	6,683	0.55%	1,149	0.71%	122	0.51%
Town/cluster/semi-detached house	5,345	0.44%	1,509	0.94%	66	0.28%
House/flat/room in back yard	16,132	1.33%	2,682	1.67%	314	1.32%
Informal dwelling/shack in back yard	23,591	1.94%	6,274	3.90%	798	3.36%
Informal dwelling/shack NOT in back yard e.g. in an informal/squatter settlement	44,100	3.63%	12,516	7.79%	1,685	7.10%
Room/flatlet not in yard but on a shared property	15,242	1.25%	4,576	2.85%	965	4.06%
Workers' hostel(bed/room)	24,099	1.98%	9,267	5.77%	2,235	9.41%

(Statistics South Africa, 2007)

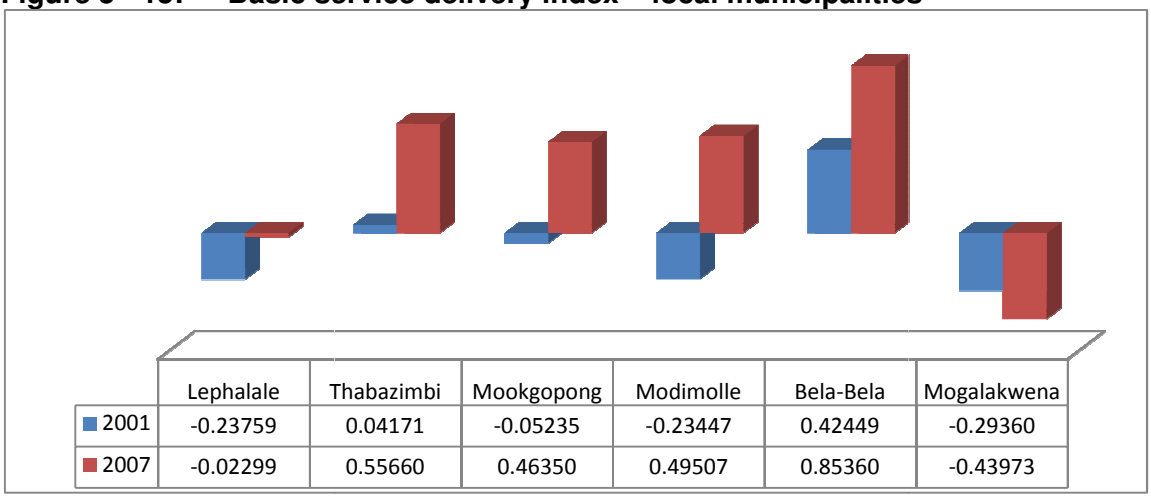
Having described the demographic profile across the region it would now be pertinent to consider the level of service delivery across all 6 local municipalities in the Waterberg district. In a study undertaken by the North-West University in 2009 the focus was to assess the performance of service delivery at local municipal levels. The results of this study will now be discussed as they apply to the 6 local municipalities impacted by the MCWAP. The aim of the paper produced by the North-West University was " *...to shed more light on delivery at a local level by using data from the 2001 Census and the 2007 Community Survey. The analysis involves the construction of a service delivery index for each municipality and analysis of variance to explain the changes in service delivery over the period 2001 to 2007"* (Krugell, Otto, & van der Merwe, 2009, p. 1).

The service delivery index constructed for the study was based on the percentage of households that;

- Have piped water delivered into the dwelling;
- Use electricity for cooking, heating and lighting;
- Have a flush toilet connected to the sewerage system;
- Have their refuse regularly moved by the authorities;
- Live in brick housing structures.

Figure 5 - 15 below illustrates the level of service delivery across the relevant municipalities, with the scores ranging between +2 and 0 on the positive side and 0 to 2 on the negative side. In respect of service delivery for the 6 local municipalities within the Waterberg district over the period 2001 to 2007, Bela-Bela scored highest at 0.42449 in 2001 improving to 0.85360 by 2007. Mogalakwena scored the lowest at -0.29360 in 2001 dropping to -0.43973 by 2007. The researchers point out that "[p]*ositive index values indicate better aggregate service delivery above the national average* (Krugell, Otto, & van der Merwe, 2009, p. 6).

Figure 5 - 15: Basic service delivery index – local municipalities



	Lephalale	Thabazimbi	Mookgopong	Modimolle	Bela-Bela	Mogalakwena
2001	-0.23759	0.04171	-0.05235	-0.23447	0.42449	-0.29360
2007	-0.02299	0.55660	0.46350	0.49507	0.85360	-0.43973

Data source: (Krugell, Otto, & van der Merwe, 2009, pp. 15-17)

It is against the background provided above and the detailed description of the proposed route and route alternatives that the social impacts associated with the Mokolo and Crocodile River (West) Water Augmentation Project will now be considered.

6. Social Impacts

The following impacts, listed alphabetical below except for the do nothing alternative, have been identified in association with the proposed project;

- Access issues
- Crime and security
- Disturbance of Cultural, Spiritual and Religious Sites
- Dust and Pollutants
- Economic Effects on a Cumulative Basis
- Fencing
- Fire hazards
- Impact on Farming Operations
- Job Creation
- Noise
- Relocation
- Sense of Place
- Services Infrastructure and Provisions
- SMME opportunities
- STDs, HIV and AIDS Risk
- Social Stability
- Traffic Disruption During Construction and Maintenence
- Do Nothing Alternative

These impacts will now be considered in respect of the following project activities, during the pre-construction, construction and operational phases of the project.

Pre-construction: Entails *inter alia* the following:

- Detailed engineering design;
- Detailed geotechnical investigations;
- Surveying;
- Procurement process for Contractors;
- Siting of construction camps; and
- Siting of borrow pits.

At the social level pre-construction activities are largely at a nuisance level and, although certain activities such as site visits, can cause damage to specific land owners virtually all of the pre-construction activities can be combined and assessed along with the construction activities as is done in this report.

Construction: It is envisaged that the construction of the pipeline will proceed as follows:

- Remove topsoil in the area where construction will take place and stockpile separately for later re-instatement.
- Excavate pipe trench.
- Install and compact pipe bedding.
- Install pipe sections by means of side booms (special cranes) and weld joints.

Figure 6 - 1: Typical excavation and pipe laying activities



- Repair field joints and backfill and compact pipe trench in layers.
- Construct valve and access chambers.

Figure 6 - 2: Access chamber during construction and once complete

- Re-shape the impacted area to its original topography and replace stripped topsoil.

Figure 6 - 3: Example of reinstated and rehabilitated pipeline routes

- Install final Cathodic Protection measures.
- Install AC mitigation measures.
- Install pipeline markers.

Operation: The operational phase of the project entails the operation of Mokolo Dam and the control centre as well as maintenance and repair of the entire pipeline.

- Mokolo Dam will remain a Department of Water Affairs asset and will be maintained according to the department's Operation and Maintenance Philosophy (Nemai Consulting, 2010a, p. 40).
- A control centre comprising of administration offices, a central control room, stores and workshop will be established from which the scheme will be administered, monitored and maintained.
- Maintenance will entail routine planned maintenance and major and minor breakdown repairs.

A full description of the proposed route and route alternatives, as well as all pre-construction, construction and operational activities, is provided in the Draft EIA (Nemai Consulting, 2010a)

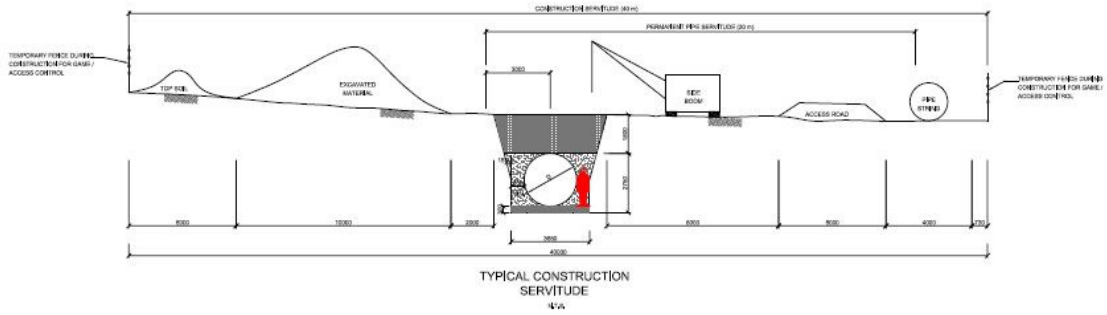
Each of these impacts as listed above will now be discussed and assessed in respect of the MCWAP.

6.1. Access Issues[1]

Description of impact: The construction of the MCWAP is likely to result in the restriction of access across the length of the pipeline corridor.

The issue of access will be most pertinent during the construction phase of the project although it will be of a temporary nature. The nature of the trench geometry is such that construction will restrict access across the site. This is clearly illustrated in Figure 6 - 1 above and Figure 6 - 4 below, both of which provide an indication of the extent of disruption likely to occur along the length of the pipeline during construction.

Figure 6 - 4: Typical trench geometry



The issue of access was raised by various I&APs, for instance, at a Public Meeting and Open day in Lephalale on 28 May 2009, it was requested that "[t]*he construction process must ensure landowners always have access to all parts of their properties*" and that "[p]rovision ... *be made for the migration of animals and their access to water points during construction.*"

In response to the question "How will access control be managed?" A representative for Trans-Caledon Tunnel Authority (TCTA) indicated that "*the contractor normally will*

[1] Quotations in this report, extracted from the Draft Comments and Responses Report, are inserted verbatim.

fence / screen off the construction servitude but provision must be made for animal migration to watering points (for example) [and continued to mention that] *... the fencing / screening material will depend on the type of game that is present on a farm. For example, buffalo and rhino will require different measures than kudu and impala* [and that] *... advice from the landowners will also be valuable in bridging this problem.*"

Another land owner pointed out on " *...several occasions that the proposed pipeline route will have a detrimental effect on many of his erven as well as the access route to the ECO Park.*"

Concerns were also raised about access in the vicinity of the Mokolo Dam and it was "[*m]entioned that the narrow one lane access road* [to] *the Mokolo Dam is the only access road. Mentioned that there are maintenance teams permanently living on the dam site, and that their only access road would be cut off should this road be used for construction purposes. Mentioned that their kids must be taken to school and that access to the Dam should be available at all times should a pump break, etc.*"

In response to this a representative of the contractors "*commented that access between the Mokolo Dam and Wolvenfontein Reservoirs will be maintained during construction and that the road will not be closed for excessive periods of time. Where required, the access road will be widened to allow passing of traffic to and from Mokolo Dam.*"

The issue of fire control is also a concern and one I&AP "[i]*ndicated that there is only one access point across the river to access the fire control road and that this access will be cut off during construction this will make it impossible for the farmers to assist each other with fire control.*"

It was also pointed out " *...that there is only one access point to one of the drinking points on his farm, and this point of entry will be blocked off as a result of the proposed pipeline construction.*"

The impacts of access across the pipeline, during both the construction and operational phases of the project, are assessed in Table 6 - 1 below.

Table 6 - 1: Access issues

Construction Phase without Mitigation Measures								
Route	**Scale**	**Relevance**	**Duration**	**Reversibility**	**Probability**	**Significance**	**Status**	**Confidence**
Main	Local	Relevant	Short-term	Reversible	Definite	Medium	Negative	Very
Operational Phase without Mitigation Measures								
Main	Local	Moderately Relevant	Long-term	Reversible	Almost Certain	Low	Negative	Very

Mitigation objective: To limit any disruption of access across the selected route that may be caused by the pipeline.

Mitigation measures:

- Design and provide crossing points that are sufficiently distributed so as to secure existing routes currently used by farmers and local communities;
- Ensure that central service nodes such as schools, clinics, water sources, places of worship, etc. remain easily and safely accessible;
- Ensure that crossing points are adequate for people and livestock.
- Consult with local authorities and communities when planning crossing points.

Assessment of construction phase with mitigation:
As assessed across the entire route, mitigation is likely to result in the significance of the impact changing from that of medium to low.

Assessment of operational phase with mitigation:
As assessed across the entire route, mitigation is unlikely to result in the significance of the impact changing.

6.2. Crime and Security

Description of impact: An increase in the risk of criminal activity due to an influx of workers during the construction and operational phases.

During construction there will be an increase in activity as the construction process unfolds introducing some risk of crime due to an influx of job seekers and possibly an opportunistic criminal element. Although the risk of crime posed by the project is likely to decrease during the operational phase it may occur, to a limited degree, during routine maintenance activities and minor and major repairs.

There is some concern amongst I&APs regarding " ...*the potential increase in theft and farm attacks during the construction*" phase of the project, a point raised by the Transvaal Agricultural Union. While another farmer pointed out the importance of having "[a]*dditional security services for personal safety, theft and fires... during construction*."

The impacts of crime and security across the routes, during both the construction and operational phases of the project, are assessed in Table 6 - 2 below.

Table 6 - 2: Crime and security

Construction Phase without Mitigation Measures								
Route	**Scale**	**Relevance**	**Duration**	**Reversibility**	**Probability**	**Significance**	**Status**	**Confidence**
Main	Local	Relevant	Short-term	Reversible	Almost Certain	Medium	Negative	Very
Operational Phase without Mitigation Measures								
Main	Local	Moderately Relevant	Long-term	Reversible	Almost Certain	Low	Negative	Very

Mitigation objective: To reduce the risks of crime.

Mitigation measures:

- Establish liaison structures with local police to monitor changes during the construction phase;
- Where necessary additional security should be provided;
- South African legislation makes allowance for the establishment of Community Policing Forums. Where they do not exist in the affected areas the contractor should assist with facilitating the establishment of these forums.

Assessment of construction phase with mitigation:
Assessed across the entire route, mitigation is likely to result in the significance of the impact changing from that of medium to low.

Assessment of operational phase with mitigation:
As assessed across the entire route, mitigation is unlikely to result in the significance of the impact changing as it is already low.

6.3. Disturbance of Cultural, Spiritual and Religious Sites

Description of impact: The pipeline could impact physically on areas of cultural, spiritual or religious significance and/or could interfere with access to these sites.

A cultural heritage survey, undertaken for the project, indicated that ruins from the more recent past, a family cemetery and heritage structures were identified however that "[t]*he study area does not contain sites that are associated with social value*" (Marias-Botes, 2010, p. 16).

Although the impacts of the disturbance of cultural, spiritual and religious sites across the routes seems insignificant, and is therefore not assessed here, it is still important to note that there will always be the possibility that a culturally sensitive site may be discovered during construction. Consequently, it is important to follow the recommendations of the heritage specialist and have an archaeologist on stand-by over the construction period.

6.4. Dust and Pollutants

Description of impact: Dust and various air born pollutants will be emitted during the construction phases of the project.

Construction will result in the emission of various air pollutants attributed to the use of petrol and diesel-powered vehicles and equipment. It is anticipated that the air pollutants to be emitted include nitrogen oxide, hydrocarbons, carbon monoxide, sulphur dioxide and particulate matter. During the operational phase vehicle traffic is also likely to contribute to the general overall exhaust emissions, which could have a negative impact on the health of people.

An electronic scan of the Draft Comments and Responses Report indicates very little concern amongst the I&APs regarding dust and air pollutants with only one I&AP raising a concern about "[a]*ir pollution and acid rain as a result of the power station/s.*" This, however, which would need to be the focus of a separate EIA in respect of the power stations and cannot be directly related to this project.

The impacts of dust and pollutants across the routes, during both the construction and operational phases of the project, are assessed in Table 6 - 3 below.

Table 6 - 3: Dust and pollutants

Construction Phase without Mitigation Measures								
Route	**Scale**	**Relevance**	**Duration**	**Reversibility**	**Probability**	**Significance**	**Status**	**Confidence**
Main	Local	Irrelevant	Short-term	Reversible	Definite	Low	Negative	Very
Operational Phase without Mitigation Measures								
Main	NA	NA	NA	NA	NA	NA	NA	NA

Mitigation objective: To ensure that dust and air pollutants are maintained at acceptable levels in accordance with World Health Organisation (WHO) guidelines.

Mitigation measures:

- Regularly monitor levels of air pollution;
- During construction all vehicles and construction machinery should be maintained to a standard that minimises pollutants.

Assessment of construction phase with mitigation:
Significant levels are low and mitigation is unlikely to result in the significance of the impact changing.

Assessment of operational phase with mitigation:
This impact does not apply during the operational phase.

6.5. Economic Effect on a Cumulative Basis

Description of impact: The cumulative socio-economic impact of the project.

According to the economic study the project is necessary to supply the Lephalale region with the required water to cope with future demands made by proposed developments in the area. It is predicted that these future developments will result in a huge economic benefit to the regional economy, however, the project will also result in certain negative impacts which they list as;

- "*Mokolo Catchment – Waterberg District and Lephalale Local Municipality's,*
- *Mokolo Catchment – Risk of irrigators below the Mokolo Dam,*
- *Mokolo Catchment – Game farming, eco-tourism and hunting,*
- *Crocodile West Catchment – Irrigators*" (Conningarth Economists, 2010, p. 70).

These impacts are assessed and mitigation measures are proposed in the economic study. Consequently, apart from noting the overall socio-economic benefits of the

project when considered together with other proposed projects in the region and particularly with respect to employment and household income, the macro-economic impact of the project will not be assessed here. For a much more detailed insight into the economic impacts of the project refer to the economic report (Conningarth Economists, 2010).

6.6. Fencing

Description of impact: The provision and maintenance of fencing during construction.

The issue of fencing refers to 3 scenarios;

1. Damage to existing farm fencing,
2. Fencing of the servitude during the construction phase and
3. Fencing of the servitude during the operational phase.

With regard to damage to existing farm fencing an I&AP indicated that he "*can foresee that his game fence will be influenced.*" Another "[i]*ndicated that 1km of game fence was damaged during blasting activities undertaken for the previous pipeline construction* [and] *that his farm is fenced off with a double game fence, which costs around R 1 million ... he will not allow anyone to damage his game fence.*"

A third farmer indicated " *...that the game which occurs on his farm is bought for R300,000.00 a head and that he does not want any disturbance on his farm which could disturb the game, or damage fences that could lead to game escaping from the farm.*"

While another farmer "[m]*entioned that should the pipeline be constructed that it would be constructed along 3km of his game fence* [and] *that 3km of his game fence will therefore be destroyed and requested compensation for the damages*.

In responding to these concerns the consultants " *...stated that any damages caused by the contractor must be repaired according to specification for game fencing. For the construction servitude a new fence will be erected, which is of the same standard as the existing fence to protect the landowner's game*."

While the EIA consultants confirmed " *...that rectification of damage to property will be included in the EMP* [and] *mentioned that costs for the rectification* [of] *damages should*

be added to the compensation amount, or fences damaged during construction should be fixed the by the contractor."

Regarding the fencing of the servitude during construction a farmer posed the question "[w]ill the construction servitude be fenced off?" To which the consultant "*replied that the construction servitude will be fenced off and that the quality/type of fence will depend on the existing type of fence.*"

A request was also made for the servitude not to be fenced off after construction to which the consultants responded by indicating " *...that the servitude will not be fenced off after construction.*"

The impacts on fencing are assessed in Table 6 - 4 below.

Table 6 - 4: Fencing

Construction Phase without Mitigation Measures								
Route	**Scale**	**Relevance**	**Duration**	**Reversibility**	**Probability**	**Significance**	**Status**	**Confidence**
Main	Local	Relevant	Short-term	Reversible	Definite	Medium	Negative	Very
Operational Phase without Mitigation Measures								
Main	Local	Irrelevant	Long-term	Reversible	Unlikely	Low	Negative	Very

Mitigation objective: To ensure that adequate fencing is provided at all times so as to protect people and protect and secure animals during construction and operation.

Mitigation measures:

During construction;

- The sites should be fenced off to prevent access to the construction sites;
- Fencing is to be inspected weekly and maintained properly, by the Contactor, until construction is complete;
- Any damage to farm fencing must be adequately and promptly repaired to acceptable standards.

During the operation;

- Any damage to fencing during routine maintenance and repairs must be adequately and promptly repaired to acceptable standards.

Assessment of construction phase with mitigation:
Mitigation is likely to result in the relevance of the impact changing to that of moderately relevant and the significance to that of low.

Assessment of operational phase with mitigation:
The level of impact is extremely low and mitigation is unlikely to have any significant affect.

6.7. Fire Hazards

Description of impact: The risk of fires due to construction and maintenance activities.

The risk of veld fires is likely to arise as a result of construction activities as workers tend to smoke and cook food in the vicinity of the construction sites. Although the risk may be somewhat less during operation it would still exist to some degree during maintenance and repair activities.

In this regard a concern was raised by a farmer who requested that "[a]*dditional security services for personal safety, theft and fires*" be addressed during construction. No mention of the risk of fires during the operational phase of the project was found in the Draft Comments and Response Report which probable indicates that, during this phase, this risk is regarded as relatively low. Nevertheless the consequences of uncontrolled veld fires are sever for both farmers and farm workers and every effort must be made to reduce this risk at all times.

The impacts of fire hazards across the routes, during both the construction and operational phases of the project, are assessed in Table 6 - 5 below.

Table 6 - 5: Fire hazards

Construction Phase without Mitigation Measures								
Route	**Scale**	**Relevance**	**Duration**	**Reversibility**	**Probability**	**Significance**	**Status**	**Confidence**
Main	Local	Relevant	Short-term	Reversible	Almost Certain	Medium	Negative	Very
Operational Phase without Mitigation Measures								
Main	Local	Relevant	Long-term	Reversible	Almost Certain	Low	Negative	Very

Mitigation objective: To reduce the risk and with it the occurrence of fires along the pipeline.

Mitigation measures:

- Provide strategically placed emergency access points during both construction and operation so as to ensure that landowners and emergency services are able to assist each other in response to fire outbreaks.
- Ensure that both construction and maintenance personnel are made aware of the risks and dangers of veld fires and at all times behave in a manner to reduce this risk.
- Ensure close co-operation between landowners and construction and maintenance staff to ensure an effective fire management strategy.

Assessment of construction phase with mitigation:
Mitigation is likely to result in the significance of the impact changing from medium to low.

Assessment of operational phase with mitigation:
Mitigation is unlikely to result in any significant change in respect of this impact.

6.8. Impact on Farming Operations

Description of impact: The construction of a pipeline through a farming area is likely to disrupt routine farming operation.

A number of landowners have voiced their concern about disruptions that the pipeline construction is likely to cause in respect of their daily farming operations. As one farmer asks, "[h]*ow will eco-tourism, game farming* [and] *conservation operations along all the above mentioned rivers be affected?*"

In this regard the economic study indicates that there will be a marginal negative effect with respect to eco-tourism, game farming and conservation operations during the construction of the pipeline and that this effect will be even less during the operational phase of the project. These impacts are discussed in detail in the economic report (Conningarth Economists, 2010, pp. 58-59)

These impacts are assessed, on a social basis, across the alternative routes during both the construction and operational phases of the project and are presented in Table 6 - 6 below.

Table 6 - 6: Impact on farming operations

Construction Phase without Mitigation Measures								
Route	**Scale**	**Relevance**	**Duration**	**Reversibility**	**Probability**	**Significance**	**Status**	**Confidence**
Main	Local	Relevant	Short-term	Reversible	Definite	Medium	Negative	Very
Operational Phase without Mitigation Measures								
Main	Local	Moderately Relevant	Long-term	Reversible	Almost Certain	Low	Negative	Very

Mitigation objective: To reduce disruptions caused by the construction of the pipeline.

Mitigation measures:

- Liaise with farmers and farmer associations with the aim of finding solutions to any restrictions placed on the movement of farm equipment and animals within and between farms during construction.
- Provide safe and, where possible, convenient access points as discussed under Access 6.1 above.
- If and where feasible, coordinate construction activities with farming activities, to minimise disruptions in respect of both sets of activities.

For further mitigation measures see section 6 Conclusion and Mitigation on pages 67-73 of the Economic Report.

Assessment of construction phase with mitigation:
Mitigation is likely to result in the significance of the impact changing to low.

Assessment of operational phase with mitigation:
Mitigation is unlikely to result in any significant changes occurring.

6.9. Job Creation

Description of impact: The project is likely to result in the creation of jobs during both the construction and operational phases.

According to the economic report, during Phase 1 of the project, "[t]*he total impact on employment amounts to 2 221 employment opportunities (2009) that will be sustained*

on an annualised basis over the period involving the construction of augmentation pipelines and weirs, irrigation effects and the game farming, hunting and tourism effects combined. Of this number, 2 043 are associated directly with the project per se whether in construction or when in operation" (Conningarth Economists, 2010, p. 66)

Although the number of employment opportunities created through the project will outweigh jobs lost in the agricultural industry (Conningarth Economists, 2010) the significance of these job losses must not be underestimated, particularly for those families who rely on the income from these jobs. The number of people in Lephalale who have no income is high at 48.1% (Statistics South Africa, 2007).

The issue of job creation, particularly when it comes to temporary jobs, must also be seen against the argument made by some that temporary job creation can be disruptive to certain communities. The argument is that workers leave what are more secure permanent jobs, to take up what appears to be a better paying temporary position with better working conditions attached, only to find once the temporary job ends that they are unable to regain permanent employment. There are also those who argue against the promise of employment that projects such as roads bring (Mqadi, 2005).

The impacts of job creation during both the construction and operational phases of the project are assessed in Table 6 - 7 below.

Table 6 - 7: Job creation

Construction Phase without Mitigation Measures								
Route	**Scale**	**Relevance**	**Duration**	**Reversibility**	**Probability**	**Significance**	**Status**	**Confidence**
Main	Local	Relevant	Short-term	Reversible	Definite	Medium	Positive	Very
Operational Phase without Mitigation Measures								
Main	Local	Relevant	Long-term	Reversible	Definite	Medium	Positive	Very

Optimisation of benefits: To optimise the local level impact with regard to job creation.

Optimisation measures:

- Establish a 'labour and employment desk';
- Create opportunities for the employment of women;
- Where possible use labour-intensive methods of construction;
- Use local labour as far as possible;
- Develop a community labour agreement with targets for employment and for progression;

- Go beyond the minimum wage rate and invest in local staff.

Assessment of construction phase with optimisation:
Optimisation is likely to result in the significance of the impact changing from medium to high.

Assessment of operational phase with optimisation:
Optimisation is unlikely to result in any significant change to the impact.

6.10. Noise

Description of impact: The construction of the pipeline is likely to result in an increase in noise levels.

The psycho-social effects of noise includes irritation, mental health disturbances, noise induced stress and sleep disturbances and has been found to lead to depression (Öhrström, 1991). Although difficult to measure on a social level these effects are likely to be most severe where the relative quiet of a rural area is disrupted by noise associated with the construction of the pipeline. The international tendency for evaluating the impact caused by intruding noise is to specify an average ambient noise level of 55dBA and 45dBA during the day and night respectively, as the maximum average ambient noise levels to which residential premises in urban areas should be exposed (Berglund, Lindvall, & Schwela, 1999). As the project is situated in what is a rural area, renown for tourism and game farming the issue of noise reduction during construction becomes important.

As an I&AP points out " *...during a previous upgrade at Zeeland waterworks ... jackhammers* [were] *used during the winter season where after they were forced to accommodate their international clientele elsewhere at their own cost because of the noise.*"

The impacts of noise during the construction of the project is assessed at the social level and presented in Table 6 - 8 below.

Table 6 - 8: Noise

Construction Phase without Mitigation Measures								
Route	**Scale**	**Relevance**	**Duration**	**Reversibility**	**Probability**	**Significance**	**Status**	**Confidence**
Main	Local	Relevant	Short-term	Reversible	Definite	Medium	Negative	Very
Operational Phase without Mitigation Measures								
Main	NA	NA	NA	NA	NA	NA	NA	NA

Mitigation objective: To reduce the affects of noise that may be generated during construction.

Mitigation measures:

- Construction activities and vehicle movement should be restricted to daylight hours.
- All vehicles and construction machinery should be maintained to a standard that prevents the noise levels causing any unnecessary and avoidable nuisance to the workforce and local communities.

Assessment of construction phase with mitigation:
Mitigation is likely to result in the significance of the impact changing from medium to low.

Assessment of operational phase with mitigation:
This impact is not applicable during the operational phase of the project.

6.11. Relocation

Description of impact: The construction of the pipeline may, in certain areas, result in households needing to be resettled.

Although it is *most unlikely* that there will be a need for any large scale relocation of people due to the pipeline it is possible that people living in the Steenbokpan area may need to be relocated. Many of these people have migrated to the area in search of employment opportunities and have erected informal housing structures in the vicinity of the proposed pipeline.

If the resettlement of these people is required this will need to be done in according to recognised acceptable relocation practices. International experience in this regard

shows that, unless the best practice benchmarks are achieved, resettlement exposes affected people to a range of risks such as:

- landlessness
- homelessness
- joblessness
- economic and social marginalisation
- increased morbidity and mortality
- food insecurity
- loss of access to common property resources
- social and cultural disarticulation/disruption

In this regard poorer households are particularly vulnerable (Cernea M. , 1997).

Relocation will need to take place prior to the construction of the pipeline and consequently will not apply during the operational phase of the project. The impacts of relocation across the routes are therefore only assessed in respect of the construction phase of the project and presented in Table 6 - 9 below.

Table 6 - 9: Relocation

Construction Phase without Mitigation Measures								
Route	**Scale**	**Relevance**	**Duration**	**Reversibility**	**Probability**	**Significance**	**Status**	**Confidence**
Main	Local	Relevant	Short-term	Irreversible	Unlikely	Medium	Negative	Very
Operational Phase without Mitigation Measures								
Main	NA	NA	NA	NA	NA	NA	NA	NA

Mitigation objective: To provide an acceptable alternate resource for those affected by relocation.

Mitigation measures:

Resettlement must be conducted in terms of international best practice and accompanied by a comprehensive resettlement action plan (RAP). This goes further than merely fulfilling the legislative requirements of compensation. According to the World Bank's Revised Policy on Involuntary Resettlement (OP/BP 4.12) (2006), best practices must ensure that:

- Involuntary resettlement should be avoided, or minimised where unavoidable.
- Where resettlement is unavoidable, resettlement plans and activities should be seen and executed as development programmes.
- Resettled persons should be provided with sufficient investment resources and opportunities to share in project benefits.

- Displaced persons should be meaningfully consulted, and should participate in the planning and implementation of resettlement programmes.
- Displaced persons should be compensated, prior to the move, for their losses at full replacement cost.
- Resettled persons should be assisted with the move and provided with support during the transition period.
- Resettled persons should be assisted with their efforts to improve, or at least restore, their former living standards, income earning capacity and production levels – whichever is higher.

A resettlement action plan (RAP) or resettlement policy framework (RPF) needs to be agreed through negotiations with the affected parties and other key stakeholders (i.e. Dept of Land Affairs, Dept of Housing, Local Municipalities and Traditional Local authorities), prior to the widening of the road and demolition of houses. According to the World Bank best practice principles and International Finance Corporation (IFC) performance Standard 5, such a plan or framework should spell out the following;

1) Why people need to be resettled,
2) Where people need to be resettled to,
3) Who specifically would be affected,
4) How they would be compensated,
5) Grievance procedures,
6) Who the responsible agents would be,
7) The timeframe for the resettlement process,
8) The budget/cost estimate and
9) How the resettlement process would be monitored and evaluated (IFC 2002, WB 2001).

The developers will need to commission independent experts to undertake a land audit and to facilitate the development of the RAP/RPF. Alternative housing and/or compensation would also need to be provided to the affected parties prior to the actual relocation activities.

Assessment of construction phase with mitigation:
Mitigation measures are unlikely to result in the significance changing from medium to low.

Assessment of operational phase with mitigation:
This impact does not apply during the operational phase of the project.

6.12. Sense of Place

Description of impact: The construction of a pipeline through a rural area is likely to change the rural atmosphere during construction and may temporarily alter the rural lifestyle and sense of place for some residents.

Sense of place incorporates more than the physical attributes related to the area but also encompasses the social, natural and cultural elements. During construction it is possible that residents may experience a short-term change to the environment resulting in a temporary disruption of their sense of place. It is, however, most likely that once the construction crews move out of the area that the sense of place will be restored.

This impact is assessed and presented in Table 6 - 10 below.

Table 6 - 10: Sense of place

Construction Phase without Mitigation Measures								
Route	**Scale**	**Relevance**	**Duration**	**Reversibility**	**Probability**	**Significance**	**Status**	**Confidence**
Main	Local	Relevant	Short-term	Reversible	Unlikely	Low	Negative	Very
Operational Phase without Mitigation Measures								
Main	NA	NA	NA	NA	NA	NA	NA	NA

Mitigation objective: To limit any negative visual impact that the project may have on the environment and retain the sense of place as best as possible.

Mitigation measures:

- Consult with affected communities in an effort to identify and address issues relating to the sense of place;
- Reinstate the natural environment as swiftly as possible.

Assessment of construction phase with mitigation:
Mitigation is unlikely to result in any significant change occurring.

Assessment of operational phase with mitigation:
This impact does not apply to the operational phase of the project.

6.13. Services Infrastructure and Provision

Description of impact: Interference with service infrastructure and provision along the route.

As with all construction projects, similar in nature to the MCWAP, there is a risk that as construction progresses along the route it may have a negative impact on various service facilities and infrastructure in the area. These concerns, were indicated in the Comments and Response Report and are listed as follows.

It was required " ...*that pictures must be taken of all existing infrastructure (fences, gates, roads, etc.) before construction to serve as reference afterwards.*"

To which the consulting engineers indicated that "[a]*s part of the baseline assessment to be done for the proposed route the whole route will be walked to identify all existing infrastructure that might be affected. The exact location of the proposed route will only be known after the detail designs have been finalised.*"

There were also concerns " *...with regards to the existing water supply during the construction of the proposed pipeline.*" A suggestion was made " ...*that a contractor should be appointed to move the current take-off points which will be damaged as a result of the new pipeline construction prior to the commencement of the pipeline construction in order to ensure the protection of the current take-off points and to ensure that landowners will have access to water during the construction phase.*"

It was indicated by a farmer " ...*that the road on his farm has a concrete surface which will be damaged during the construction phase by the heavy vehicles* [and] [r]*equested that road surfaces be fixed after construction.*"

The impact on service infrastructure and provision is assessed and presented in Table 6 - 11 below.

Table 6 - 11: Services infrastructure and provision

Construction Phase without Mitigation Measures								
Route	**Scale**	**Relevance**	**Duration**	**Reversibility**	**Probability**	**Significance**	**Status**	**Confidence**
Main	Local	Relevant	Short-term	Reversible	Definite	Medium	Negative	Very
Operational Phase without Mitigation Measures								
Main	NA	NA	NA	NA	NA	NA	NA	NA

Mitigation objective: To minimize any negative affect that the construction of the pipeline may have on existing infrastructure.

Mitigation measures:

- Liaise with all relevant services providers such as Eskom and local and district municipalities to ensure that any disruption to existing infrastructure is limited.
- Liaise with property owners to ensure that existing infrastructure is recorded and any damage repaired or compensated for.

Assessment of construction phase with mitigation:
Mitigation is likely to result in any the significance changing to low.

Assessment of operational phase with mitigation:
This impact will not apply during the operational phase of the project.

6.14. SMME Opportunities

Description of impact: During both the construction and operational phases of the project there are likely to be direct opportunities for Small Medium and Micro Enterprise (SMMEs).

A number of opportunities for small businesses and entrepreneurs are likely to be generated through the project. These opportunities will be both directly and indirectly associated with the project.

The impacts on SMME opportunities across the routes, during both the construction and operational phases of the project, are assessed in Table 6 - 12 below.

Table 6 - 12: SMME opportunities

Construction Phase without Mitigation Measures								
Route	**Scale**	**Relevance**	**Duration**	**Reversibility**	**Probability**	**Significance**	**Status**	**Confidence**
Main	Local	Relevant	Short-term	Reversible	Definite	Medium	Positive	Very
Operational Phase without Mitigation Measures								
Main	Regional	Relevant	Long-term	Reversible	Definite	Medium	Positive	Very

Optimisation objective: To optimise the local level impact of opening and sustaining SMMEs.

Optimisation measures:

- Establish a local SMME recruitment preference policy;
- Implement a monitoring system to ensure that the local SMME recruitment preference policy is followed.

Assessment of construction phase with mitigation:
Mitigation is likely to result in the significance of the impact changing from medium to high.

Assessment of operational phase with mitigation:
Optimisation is likely to result in the significance of the impact changing from medium to high.

6.15. STDs, HIV and AIDS Risk

Description of impact: The risk of STDs, HIV and AIDS infections due to an influx of workers and work seekers during construction.

At 20.7% in 2008, the HIV prevalence rate amongst antenatal women is relatively low in Limpopo compared to the rest of South Africa, with only the Western and Northern Cape provinces having a lower rate at 16.1% and 16.2% respectively, the rate in the Waterberg district, at 23.6%, is somewhat higher than that of the province. (Department of Health, 2009). Although, difficult to indicate with any certainty, the higher HIV prevalence rate amongst antenatal women in Waterberg is probably associated with the various developments in the region, however, no empirical research can be found to confirm this.

Construction activities are associated with income and often followed by prostitution, particularly within poor communities, and thus increase the risk of the spread of STDs, HIV and AIDS. It has also been well documented that long distance truck drivers are associated with the spread of HIV/AIDS (see for instance Alam, undated; Kulis, undated; United Nations, 2007). The increased development and construction activities will result in a rise in construction workers and truck traffic to the area increasing the risk of the spread of STDs, HIV and AIDS.

The impacts of STDs, HIV and AIDS across the routes, during both the construction and operational phases of the project, are assessed in Table 6 - 13 below.

Table 6 - 13: STDs, HIV and AIDS risk

Construction Phase without Mitigation Measures								
Route	**Scale**	**Relevance**	**Duration**	**Reversibility**	**Probability**	**Significance**	**Status**	**Confidence**
Main	Local	Relevant	Short-term	Reversible	Definite	High	Negative	Very
Operational Phase without Mitigation Measures								
Main	Local	Relevant	Long-term	Reversible	Definite	High	Negative	Very

Mitigation objective: To reduce the risk of the spread of HIV/AIDS and STDs

Mitigation measures:

- The Contractor/Operator should, in consultation with local HIV/AIDS organisations and government structures, design and implement an HIV/AIDS and STD awareness and prevention campaign for employees. This campaign should use various common practice methodologies in order to ensure social and cultural sensitivity.
- The Contractor/Operator should make HIV/AIDS and STD awareness and prevention programmes a condition of contract for all suppliers and sub-contractors.
- The Contractor/Operator should provide an adequate supply of free condoms to all workers. Condoms should be located in the bathrooms and other communal areas on the construction site.
- If viable, a voluntary counselling and testing programme should be introduced during the construction phase and continued during operations. This should be undertaken in conjunction with the existing VCT programmes within the region.

- **During the operational phase:**

- The Operator should, in association with HIV/AIDS organisations and government structures, implement an HIV/AIDS and STD awareness and prevention campaign directed at employees.

Assessment of construction phase with mitigation:
Mitigation is likely to result in the significance of the impact changing from high to medium.

Assessment of operational phase with mitigation:
Mitigation is likely to result in the significance of this impact changing from high to medium.

6.16. Social Stability

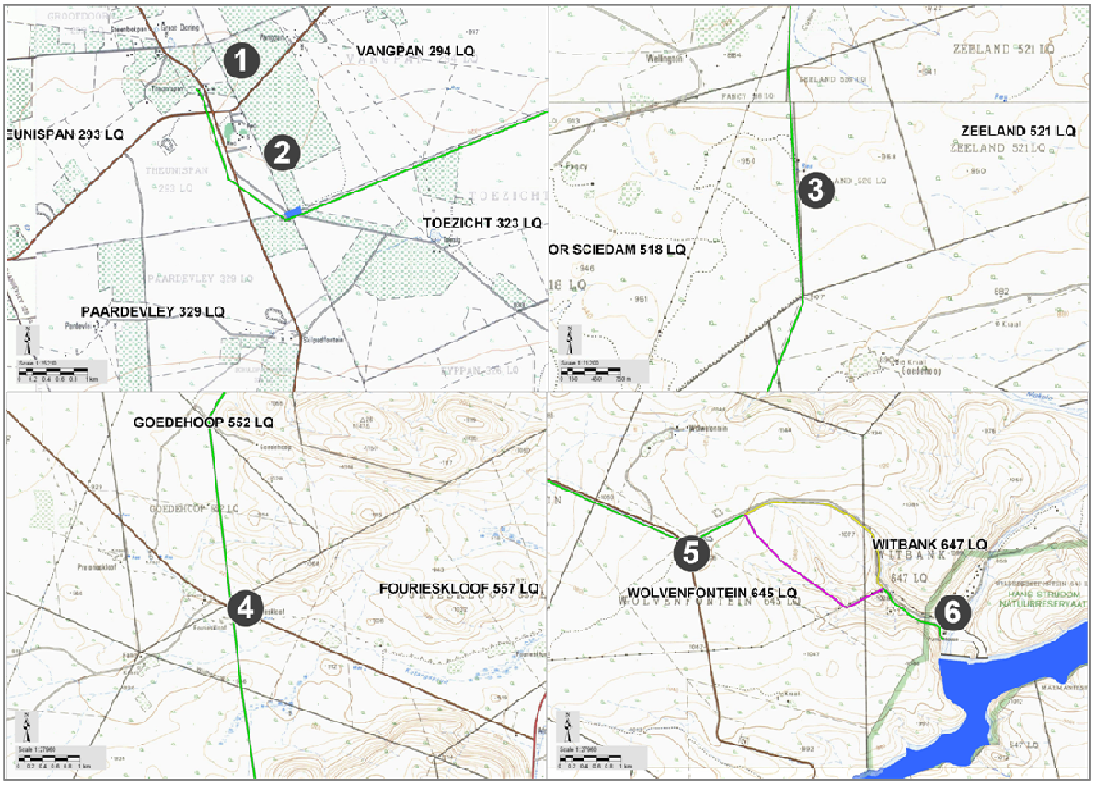
Description of impact: The effect that an influx of job seekers and workers may have on existing family networks and social structure.

The increase of workers and job seekers can create a number of negative influences within the host community in respect of

- Increase in prostitution;
- Unplanned and unwanted pregnancies;
- Increase in alcohol and drug related incidents;
- Pressure on local services, such as housing, clinics, schools, water supplies;
- Increase in local prices and the cost of living;
- Tension and conflict within the community and impact on family networks and relationships; and
- Competition for available jobs and resources.

A number of potential construction campsites have been identified as indicated in Figure 6 - 5 below.

Figure 6 - 5: Location of potential construction camps



This impact is likely to be greatest during the construction phase of the project.

The impacts on social stability across the routes, during both the construction and operational phases of the project, are assessed in Table 6 - 14 below.

Table 6 - 14: Social stability

Construction Phase without Mitigation Measures								
Route	**Scale**	**Relevance**	**Duration**	**Reversibility**	**Probability**	**Significance**	**Status**	**Confidence**
Main	Local	Relevant	Short-term	Reversible	Definite	Medium	Negative	Very
Operational Phase without Mitigation Measures								
Main	Local	Relevant	Long-term	Reversible	Almost Certain	Low	Negative	Very

Mitigation objective: To reduce the impact of an influx of workers and job seekers on existing family networks and social structures.

Mitigation measures:

- Communication channels must be maintained between the contractor and local community structures in an effort to maximise the employment of local labour.
- Make condoms readily accessible to workers.
- Liaise with the South African Police Services and community structures to ensure that the workforce is controlled.

- Where appropriate, workers from other area should be provided with adequate on-site temporary accommodation and amenities.
- On completion of the work all temporary accommodation must be dismantled and removed to prevent the development of informal settlements.

Assessment of construction phase with mitigation:
Mitigation is likely to result in the significant changing from medium to low.

Assessment of operational phase with mitigation:
Mitigation is unlikely to result in any significant change.

6.17. Traffic Disruptions During Construction and Maintenance

Description of impact: The likelihood of traffic disruptions and delays during the construction and operational phases of the project.

A number of concerns regarding traffic disruption during construction were raised by various I&APs. As was asked by one farmer, "[w]*hat measures are planned for the expected increase in traffic to the area and the impact thereof on their roads*? While another pointed out that " *...the roads in the area will be negatively impacted on because of the pipeline.*"

In response, it was indicated by the EIA consultants " *...that a Traffic Impact Assessment will be done as part of the EIA, which will determine the expected impact and how to manage it best.*"

The Traffic Management Plan outlines the required actions that the contractors need to take in order to minimise any traffic disruptions caused during construction. In particular see section 6 Traffic Management and section 7 Concluding Remarks (Kitso Engeneers Consulting Engeneers, 2010, pp. 13-16).

The impacts of traffic disruptions are assessed in Table 6 - 15 below.

Table 6 - 15: Traffic disruptions during construction and maintenance

Construction Phase without Mitigation Measures								
Route	**Scale**	**Relevance**	**Duration**	**Reversibility**	**Probability**	**Significance**	**Status**	**Confidence**
Main	Local	Relevant	Short-term	Reversible	Definite	Medium	Negative	Very
Operational Phase without Mitigation Measures								
Main	Local	Irrelevant	Long-term	Reversible	Unlikely	Low	Negative	Very

Mitigation objective: To ensure the efficient and effective management of traffic disruptions.

Mitigation measures:

- Careful scheduling of construction activities to minimize delays;
- Public communication strategy to inform public of any envisaged disruptions.
- The provision of adequate traffic warning signs and control measures that comply with national standards.
- Adhere to the mitigation measures of the traffic specialist.

Assessment of construction phase with mitigation:
Mitigation is likely to result in the significance of the impact changing from medium to low.

Assessment of operational phase with mitigation:
This impact does not apply to the operational phase

6.18. Do Nothing Alternative

Description of impact: To leave the area as it currently is without upgrading existing water supplies.

If the project was to not proceed as intended it is virtually certain that much of the development planned for the Lephalale region would be compromised. This would not only have serious negative social consequences at the local level but is likely to have severe national consequences as well, particularly if the security of electricity supply is threatened. At the local level, to ignore the water development needs of the region would place the security of water at risk, which would also have severe social consequences for commerce, industry and communities within the region. In this regard see the economic study (Conningarth Economists, 2010). These needs, however, must be balanced against the interests of those communities living downstream of the dam as their security of water resources must also be respected.

The impact of the do nothing alternative is assessed and presented in Table 6 - 16 below. This assessment is in respect of the operational phase of the project only as it is in this regard that the do nothing alternative will have by far the greatest impact.

Table 6 - 16: Do nothing alternative

Construction Phase without Mitigation Measures								
Route	**Scale**	**Relevance**	**Duration**	**Reversibility**	**Probability**	**Significance**	**Status**	**Confidence**
Main	National	Relevant	Permanent	Irreversible	Definite	High	Negative	Very

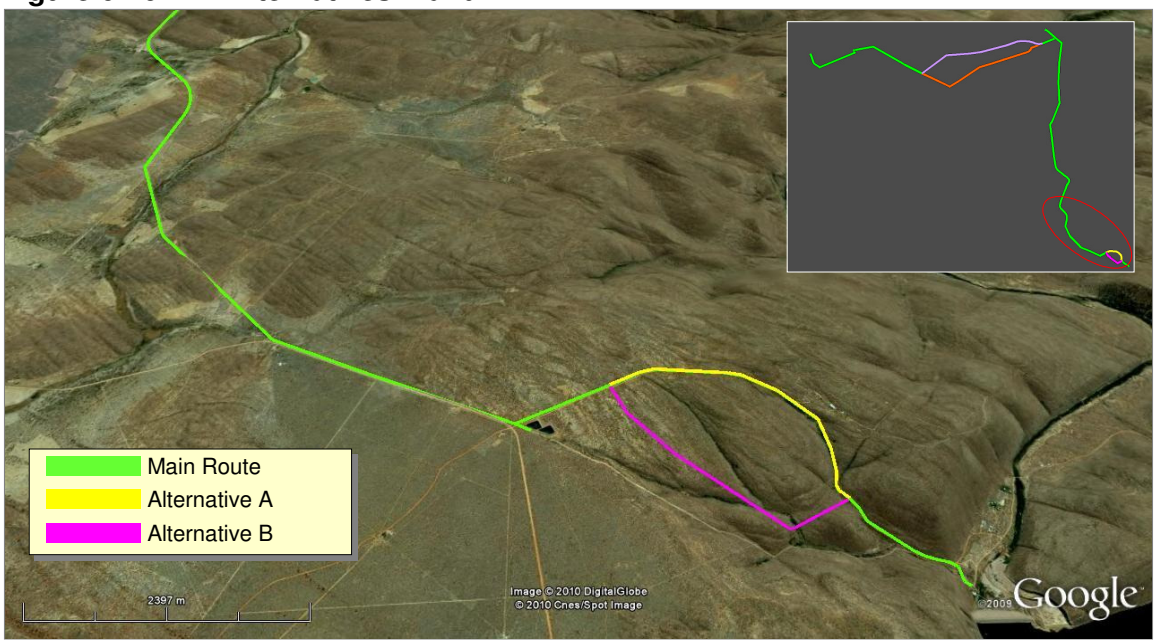
6.19. Alternative Alignments

The following alternatives were considered:

Rising Main between Mokolo Dam and Wolvenfontein Balancing Dam

In general, the alignment of the pipeline from the Mokolo Dam Pump Station to the Wolvenfontin Balancing Dams was selected to follow existing infrastructure as far as possible to minimize the environmental impact thereof. The two alignment alternatives, A and B as depicted in Figure 6 - 1**,** for the rising main from the pump station to the Wolvenfontein balancing dams include:

Figure 6 - 6: Alternatives A and B



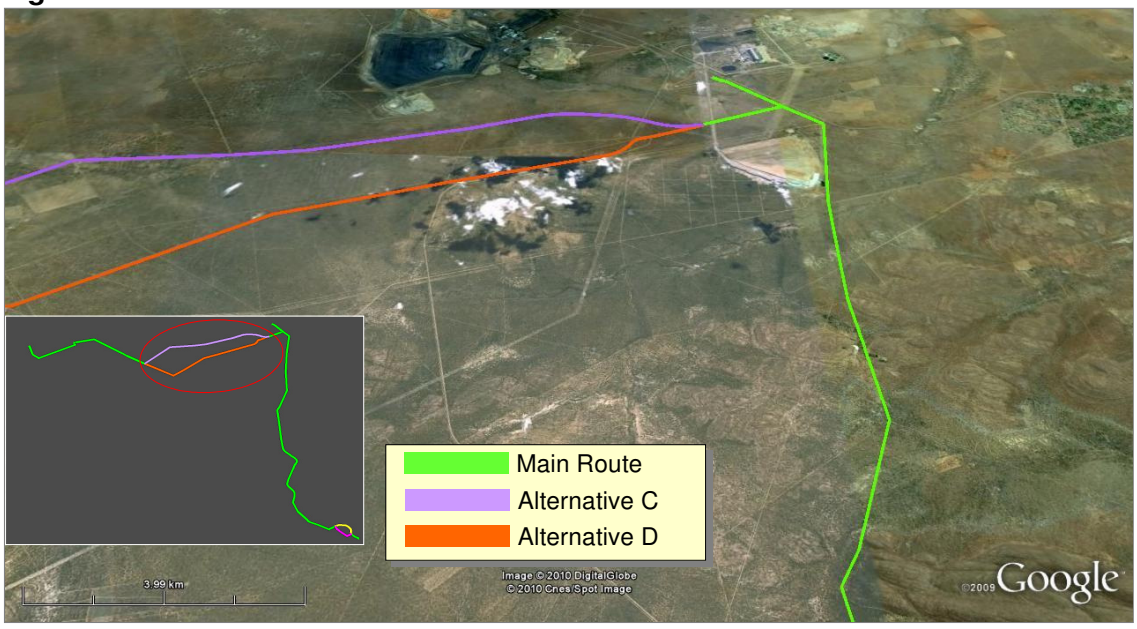
- **Alternative A:** Follows alignment of existing access road between pump station and balancing dam.

- **Alternative B:** Due to the expected negative visual impact and possible environmental impact the landowner, Mr. G. Viljoen, requested that an alternative route be chosen which partially follows the existing access road after which it splits away and runs through green fields to minimize its visual impact. Further on, closer to the pump station, the pipeline reconnects to the road and follows it to the pump station. Mr. Viljoen has developed an ECO Park (entitled Sable Hills) on the affected property. Some of the stands which he is selling are situated in such a way that they overlook the access road mentioned and should this cleared area now be broadened because of the required pipeline servitude it will lessen the appeal of these stands, which will result in a drop in their values. From a social perspective, and for the reasons described above, Alternative B is preferred over Alternative A. Selecting this route option will also result in better access to the pump station during the construction period, although there will still be sections where the pipeline will be laid next to the road, especially in narrow steep areas, access might still be affected.

Gravity Main between Matimba to Steenbokpan

In general, the alignment of the pipeline from Matimba to Steenbokpan was selected to be south of the coalfield, thus not sterilizing the coal. The two alignment alternatives for the gravity main to Steenbokpan include Alternatives C and D as depicted in Figure 6 - 7 below.

Figure 6 - 7: Alternatives C and D



- **Alternative C:** Selected to follow alignment of new Steenbokpan tar road that runs north of Medupi Power Station, but south of the coalfield. This will minimize further impact on the environment and other services. More traffic on exiting overloaded roads around Medupi Power Station is anticipated with this option, since the existing tar road will likely be used. With the implementation of the Traffic Management Plan for the project, this impact can be minimized. This alternative runs through the middle of Kringgatspruit to enable the pipeline to connect to the farm boundaries between Kringgatspruit 318 LQ and Enkeldraai 319 LQ. This was communicated to the owner of Kringgatspruit during the EIA Public Participation Process where he requested that the existing Marula trees not be harmed during the construction process, refer to Item 5.11.9 of the Comments and Response Report (Nemai Consultuing, 2010b, p. 93).

Alternative D: Follows the railway line to the south of Medupi Power Station and the farm boundaries to minimize impact on the environment. This is a less favorable route as higher quantities of hard rock excavation will be required which means more noise pollution due to anticipated blasting activities. This alternative is also further away from the coalfield where water will be used in mining operations i.e. distance to supply point from pipeline and associated cost. Alternative C emerges as the socially preferred alternative.

In summary, having considered the alternatives A, B, C and D on a social basis it has emerged that alternatives B and C are the socially preferred alignment for the pipeline. A brief discussion and conclusion will now follow.

7. Conclusion

Although a number of negative impacts are associated with this project these are typical of projects of a similar nature and to a large degree are restricted to the construction phase of the project. It is also likely that most negative impacts could, to a greater extent, be successfully mitigated as suggested. This, however, is not to underestimate the severity of these impacts, particularly as they may apply on an individual basis. In this regard note must be taken of the negative effect that the project may have on certain farming activities and the impact that this could have on landowners and farm workers. It must be noted that any disruption in livelihood or the loss of a job cannot be overstated. Notwithstanding this, however, it is important that the project be assessed

in its entirety and that consideration be given to the importance of this project as part of wider development planned for the area.

Based on this it can be concluded that, considered on an overall social basis, it is apparent that the value of **Phase 1** of the Mokolo and Crocodile River (West) Water Augmentation Project is at the broader socio-economic level and that it is also attached to future developments in the area. Consequently, it seems that the project has a significant social impact at the national level and this needs to be carefully considered.

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