Title: Social Impact Assessment (SIA): Spring Grove Dam Appurtenant Works (AW)

Author: Dr. K. U. Brügge

Project Name: Mooi-Mgeni Transfer Scheme Phase 2: Spring Grove Dam and Appurtenant Works.

Status of report: *Draft*

DWAF Report No: *PC……*

BKS Report No: *P……*

Keywords: *……; ……; ……..*

First Issue: *……*
Final Issue: *……*

BKS(PTY) LTD

Approved for BKS (Pty) Ltd by:

……
Director

DEPARTMENT OF WATER AFFAIRS
Directorate of Project Planning

Approved for the Department of Water Affairs by:

…… *……..*
Director *Chief Engineer*

MOOI-MGENI TRANSFER SCHEME PHASE 2

SPRING GROVE DAM AND APPURTENANT WORKS

Social Impact Assessment (SIA): Appurtenant Works (AW)

EXECUTIVE SUMMARY

The subject matter of this report is the proposed Spring Grove Dam Appurtenant Works (AW), including the rising main; break pressure tank at Gowrie; outfall pipeline to the Mpofana river; outfall works and river flow gauging weirs. The change processes and resulting social impacts of the AW were assessed based on a number of impact variables, and rated in terms of their significance, direction (positive or negative), extent, spatial and time-scale. The construction, operational and decommissioning phases of the proposed project were assessed separately, including pre- and -post mitigation ratings for each. A brief summary is provided:

Population change/impacts: It is the perceived prospect of employment opportunities, fuelled by potential rumours about the number of jobs to be created (and crime-related opportunities) that would attract outsiders. Impacts would result from competition between unemployed locals - a situation that would be exacerbated by outsiders, potentially resulting in conflict - the felt impact of the change process. Keeping in mind planned new developments some of which appear to be emerging on the back of the proposed Spring Grove Dam (cumulative impacts), this variable has been rated high in significance

(negative), probable, short-term and responsive to mitigation (at least those impacts which fall in the purview of the DWAF contractor(s)). In terms of changes in the age, gender, racial or ethnic composition of the population, an inflow of people from other countries in search of employment, rather than locals from surrounding communities and rural areas would be the main change process. If locals perceive this inflow as adverse and destabilizing (also in terms of social capital), or if conflict with newcomers ensues, this change would qualify as an impact high in significance (negative). Relocation related impacts were rated as probable and high in significance (negative) in response to the expected relocation of a farm-worker accommodation area on the alignment of the rising main pipeline. Although this impact is responsive to mitigation, avoidance through re-routing of the pipeline is preferred.

At the level of individuals and families, chance processes and impacts pertaining to daily movement patters; public health, safety and security were rated as highly significant (also given the potential for cumulative impacts due to existing and foreseeable future development projects). These impacts, however, should be responsive to well implemented mitigation measures. Impacts on tourism and recreational activities were rated as probable and moderate in significance (negative) to account for perceived and felt changes, including constrained access and intrusive impacts (dust; noise). Post-mitigation, the impact is expected to be moderate in significance. Interference in local social networks would depend on a number of factors, including whether newcomers are foreigners or S.A. nationals from elsewhere and will be in the area only to secure employment on the MMTS-2 project and leave if they are unsuccessful. In spite of these uncertainties, but given the importance of social capital for community safety and stability, the impact was rated as possible and high in significance (negative). Mitigation is anticipated to be difficult, but probably more achievable in terms of a stable workforce already employed by or yet to be employed by the contractor(s) to be appointed by DWAF. Socio-economic impacts were rated as probable (moderate significance due to lack of sustainability) to account for job creation and positive impacts on local business. Attitude formation and interested group activity were used as markers to analyze public sentiments toward the PROJECT. No evidence was found based on an analysis of the public participation and consultation record of negative attitudes, interest group activity, or social mobilization (either current or mooted) toward the AW in particular. Intrusion impacts (dust/air pollution; noise/vibration and visual/aesthetic impacts) were rated as probable (possible: post-mitigation), moderate in significance and short-term (sporadic: post-mitigation (dust)).

It was concluded that the proposed AW will probably not bring about change processes and impacts much more significant and remarkable than could be attributed, over time, to unrelated ones (e.g. current development; tourism and socio-economic impacts). This is particularly true for the operational phase. The construction phase has to be approached with caution to minimize or avoid population (inflow of people); movement, health, safety/security and intrusion impacts, particularly if these are added to current and foreseeable future impacts. The D146/R103 link to the proposed quarry is considered an impact hotspot in terms of construction vehicle movement and must receive particular attention.

The two key recommendations of the study are that: (1) all mitigation measures be carefully considered and implemented; and (2) a Mitigation Monitoring Committee (MMC) comprising affected parties, the project proponent; Environmental Monitoring/Control Officer (EMO); Local Government; SAPS/CPF and the DWAF contractor, be formally established. This committee should monitor the implementation and impact mitigation process, using the EMP as basis.

MOOI-MGENI TRANSFER SCHEME PHASE 2

SPRING GROVE DAM AND APPURTENANT WORKS

Social Impact Assessment (SIA): Spring Gove Transfer Scheme

TABLE OF CONTENTS

INDEX OF FIGURES

INDEX OF TABLES

LIST OF ACRONYMS

AW	Appurtenant Works
CPF	Community Policing Forum
DWAF	Department of Water Affairs and Forestry
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
HDSA	Historically Disadvantaged South-Africans
I&APs	Interested and Affected Parties.
IAIA	International Association for Impact Assessment
MMC	Mitigation Monitoring Committee
NEMA	National Environmental Management Act.
SAPS	South African Police Services
SGD	Spring Grove Dam.
AW	Spring Grove Transfer Scheme
SMME	Small, Medium and Micro Enterprises
SIA	Social Impact Assessment

1. PROJECT SCOPE, DESCRIPTION AND CONTEXT

The scope[1] of this SIA is the Spring Grove transfer scheme, which comprises[2] the following:

1.1 SPRING GROVE PUMPSTATION

The pump station is set to be constructed at the dam as a stand alone structure on the right bank of the Mooi river (Spring Vale 2170/233), approximately 100m downstream from the Spring Grove Dam outlet works.

1.2 SPRING GROVE RISING MAIN AND BREAK PRESSURE TANK

Commencing at the Spring Grove pump station (some 2km north-west from Rosetta in the Mpofana Municipal area), a new rising main will be constructed to the break pressure tank at Nottingham Road (Gowrie) (uMngeni Municipal area). On exiting the pump station, the pipeline crosses a pasture and a district road (D146) before traversing a stream and associated wetland. The alignment over this length is dictated by the need to avoid an existing farm dam. It then traverses a pasture before passing through a labour accommodation area. The line turns again to avoid a second farm dam. Thereafter, it runs between Glenelg and Mallorca before crossing Road 103 (which connects Rosetta and Nottingham Road) and the existing rail link. This crossing would require a pipe jack. Before crossing the existing Mearns rising main, the alignment traverses a wetland. It then follows the existing Mearns rising main and ties into the break pressure tank. The total length of this route is 5640m with a static lift of 65m. Whilst the base case is a duplicated break pressure tank in Nottingham Road (Gowrie Estate), a new combined break pressure tank has been factored into the engineering costing equation as an alternative[3].

The servitude for the new rising main pipeline section from the Spring Grove Pump-station to the Mearns pipeline (3 km section) is set to be 100 m^4 wide to cater for alignment changes potentially required to limit social and environmental impacts.

1.3 GRAVITY LINE AND OUTFALL WORKS

The new gravity main is to follow the existing servitude alignment (25 m wide), of the existing gravity line from Nottingham Road, terminating in a new outfall works on the Mpofana river. It is a legal requirement for servitudes vested in the state not to be interfered with, i.e. no

1 DWAF Terms of Reference for Mooi-Mngeni Transfer Scheme Phase 2, August 2006.

2 Goba Moahloli Keeve Steyn (January, 2004). Supporting Report 6, pp.16 and 32.

3 Goba Moahloli Keeve Steyn (January, 2004). Supporting Report 3, p.16.

building; roads or planning of trees on servitudes is permitted. Should such activities have taken place, these cannot be seen as social impacts attributable to the proposed AW, but second-order impacts resulting from the actions of community members.

1.4 RIVER FLOW GAUGING WEIRS

The river flow gauging weirs are proposed to be situated immediately downstream of the transfer outfall works at the Mpofana river; and on the Mooi River immediately downstream from the proposed Spring Grove Dam.

2. METHODOLOGY

A description of the methodology with respect to the SIA follows in the sub-sections below.

2.1 DEFINITION OF AN SIA

The following served as operational definitions for the SIA:

- According to the International Association for Impact Assessment (IAIA), "impact assessment, simply defined, is the process of identifying the future consequences of a current or proposed action"[5].
- Becker (1999) defines a Social Impact Assessment as: a process that serves to identify the future consequences for human populations of any public or private action that alters the way in which people live, work, play, relate to one another, organise to meet their needs, and generally cope as members of society.
- Vanclay (2002, p. 190), defines SIA as follows: "Social impact assessment is the process of analysing (predicting, evaluating and reflecting) and managing the intended and unintended consequences on the human environment of planned interventions (policies, programs, plans, projects) and any social change processes invoked by those interventions so as to bring about a more sustainable and equitable biophysical and human environment".

2.2 PRINCIPLES

The following informed the SIA by way of guiding principles

2.2.1 IAIA

(a) "Equity considerations should be a fundamental element of impact assessment and of development planning.

(b) Many of the social impacts of planned interventions can be predicted.

---

[4] Teurlings, BKS, March 2007, pers comm..

[5] IAIA (2001), available on-line.

(c) Planned interventions can be modified to reduce their negative social impacts and enhance their positive impacts.

(d) SIA should be an integral part of the development process, involved in all stages from inception to follow-up audit.

(e) There should be a focus on socially sustainable development, with SIA contributing to the determination of best development alternative(s) – SIA (and EIA) have more to offer than just being an arbiter between economic benefit and social cost.

(f) In all planned interventions and their assessments, avenues should be developed to build the social and human capital of local communities and to strengthen democratic processes.

(g) In all planned interventions, but especially where there are unavoidable impacts, ways to turn impacted peoples into beneficiaries should be investigated.

(h) The SIA must give due consideration to the alternatives of any planned intervention, but especially in cases when there are likely to be unavoidable impacts.

(i) Full consideration should be given to the potential mitigation measures of social and environmental impacts, even where impacted Communities may approve the planned intervention and where they may be regarded as beneficiaries.

(j) Local knowledge and experience and acknowledgment of different local cultural values should be incorporated in any assessment.

(k) There should be no use of violence, harassment, intimidation or undue force in connection with the assessment or implementation of a planned intervention.

(l) Developmental processes that infringe the human rights of any section of society should not be accepted. (IAIA, 2003, p.6).

○

2.2.2 NEMA

NEMA provides a framework for integrating good environmental practices into development activities. The environmental principles are summarized below:

(a) Environmental management must put people and their needs at the forefront, and must serve their interests fairly.

(b) Development must be socially, environmentally and economically sustainable. This means that the potential of the following occurring must be considered before development proceeds:

- disturbance of eco-systems and loss of biodiversity;
- pollution and degradation of the environment;

- disturbance of landscapes and sites where the nation's cultural heritage is found;
- production of waste must be minimised or avoided;
- non-renewable resources must be used responsibly;
- the precautionary principle must be applied;
- negative impacts must be anticipated and prevented and if they can't be prevented they must be minimized or remedied;

(c) Environmental management must be integrated. The best practical environmental option must be pursued.

(d) Environmental justice must be pursued so that there is not unfair discrimination in the way that negative environmental impacts are distributed.

(e) There should be equitable access to environmental resources, benefits and services to meet basic human needs. Special measures may be taken to ensure access for persons disadvantaged by unfair discrimination.

(f) Responsibility for environmental health and safety of any policy, programme or project must continue throughout the life cycle of a project.

(g) Public participation in environmental decision making must be promoted. The participation of vulnerable and disadvantaged groups must be ensured.

(h) Decisions must take into account the interests, needs and values of all interested and affected parties. This includes recognizeing all forms of knowledge including traditional and ordinary knowledge.

(i) Community well being and empowerment must be promoted through environmental education.

(j) The social, economic and environmental impacts of the activities must be assessed.

(k) The rights of workers to refuse to do work that are harmful to human health or the environment and to be informed of dangers must be respected.

(l) Decisions must be taken in an open and transparent manner and access to information provided in accordance with the law.

(m) There must be inter-governmental co-ordination and harmonisation of policies and laws.

(n) Actual or potential conflicts of interest between organs of state must be resolved through conflict resolution procedures.

(o) Global and international responsibilities relating to the environment must be discharged in the national interest.

(p) The environment is held in a public trust for the people, and the use of environmental resources must serve the public interest, and be protected as the people's common heritage.

(q) The polluter must pay for the costs of remedying pollution, environmental degradation and adverse health impacts.

(r) The vital role of youth and women in environmental management must be recognized and their full participation promoted.

(s) Sensitive or stressed eco systems must receive special attention in planning which might affect them especially when they are subject to significant resource usage and development pressure.

2.3 SPECIFIC OBJECTIVES

The specific objectives of the SIA were to:

i. Review the SIA for the Mooi-Mgeni Transfer Scheme Phase 2 (WRP Consulting Engineers, October, 2002) for purposes of background and orientation;

ii. Identify, describe and assess the prevailing positive and negative impacts in respect of the AW, during the construction, operation and decommissioning phases. (The data on I&AP's issues, concerns, attitudes and perceptions (current and previous) as well as other secondary data, including demographic and socio-economic data, served as 'raw data' input to this process).

iii. Identify cumulative impacts;

iv. Generate mitigation measures in respect of each of the impacts identified, including the identification of impacts or variables that may not be responsive to mitigation and would therefore have to be avoided. Caveat: Mitigation measures, whilst potentially being successful in attenuating impacts, can result in other undesirable side-effects, that cannot always be anticipated, as they are the function of human interaction and the patterns of relationship that exist or are altered as a result of such measures.

2.4 RESEARCH PROCESS

2.4.1 Secondary Research

i. Rationale for baseline analysis in respect of SIA

Authors such as Branch, Hooper, Thompson and Creighton (1984) emphasize the importance of a *baseline assessment and projection* in enabling a logical and theoretically sound analysis of social impacts. Baseline *analysis* (current demographic and socio-economic conditions) and *projection* (predicted future conditions without a project) also forms part of the steps of a Social Impact Assessment set out in the International Association for Impact Assessment (IAIA) Guidelines and Principles Document (May, 1994). Baseline conditions can be defined as "the *existing conditions* and *past trends* associated with the human environment in which the proposed activity is to take place…for construction projects, a geographical area is identified along with the distribution of special populations at risk"[6]. (p. 15). Baseline projection is defined as the "predicted condition without the actions (project)" (p. 18).

The chief motivations for the inclusion of a baselines analysis (see separated report) are as follows:

a. The baseline analysis and projection is integral to the definition of Social Impact Assessment: "…impacts are defined as the difference between the likely future of the affected human environment with versus without the proposed project" (IAIA Guidelines & Principles Document, May, 1994).

b. Neither the natural nor the human environment are static, and undergo changes over time (even in the absence of a project).

c. The impacts of a proposed action can only be determined properly if distinctions are drawn between it and other unrelated factors that come into effect over time (or are already in existence). The baseline analysis and projection therefore served to contextualize the analysis and rating of impacts associated with the AW, commensurate with the basic principle that social impacts can vary in intensity or severity as a function of *project setting* (and more specifically the receiving social environment, including prevailing perceptions and attitudes as well considerations such as demographic profile, including potential vulnerable groupings).

[6] The dimensions of a baseline analysis are set-out in Appendix A, for the benefit of the reader.

d. Cumulative impacts, defined as the incremental impacts of an action, i.e. the AW added to past, present, and reasonably foreseeable future actions.

- **Report Reviews**

The report review included:

- All DWAF technical reports pertinent to the Mooi-Mgeni River Transfer Scheme (Phase 2), with specific emphasis on those relating to the AW.
- The EIA and SIA Reports and associated appendices;
- Allied information such as the public participation records.

2.4.2 Phase II: Primary Research

The following served as primary data sources for the AW SIA:

- Individual interviews were held with key stakeholders; I&APs and representatives of I&APs;
- Information gathered during site visits held 5 January 2007 and the week of 2-4 May 2007, and which included the proposed Spring Grove dam site, transfer infrastructure and affected properties.
- Minutes from public meetings.
- The I&AP issues register (current) and Issues Report from 2002.

2.4.3 Impact Variables

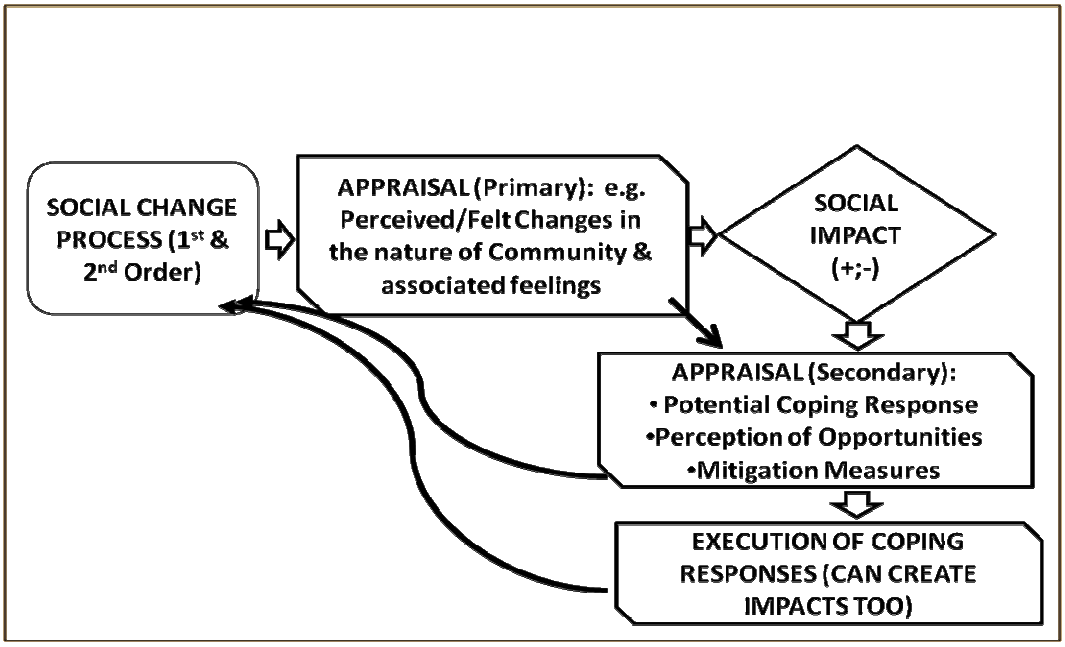
The impacts were described on the basis of a number of variables (adapted from Burdge, 1995). Whilst these variables are termed 'impacts' in certain instances (see below), their manifesting as such would depend on:

- the characteristics and history of the host community (hence the brief 'baseline analyses' provided under each section);
- I&APs perception of change processes (see below) and whether they are seen to manifest as impacts.
- the availability of potential coping responses, which lead to a re-appraisal by I&APs of change processes, therefore influencing the extent to which these are perceived as impacts (see Figure below). Executing these responses is defined as coping with the impacts[7]. Such coping responses can include planning and taking active steps to get rid of the impacts (can include mitigation measures) or to benefit from them (e.g. repositioning farm businesses to become tourism ventures); seeking social

support; learning to live with the impact(s); positive reinterpretation and growth (e.g. finding positive aspects related to the change processes). Social change processes are those that can be directly attributed to the proposed AW. They can lead to many other second- and higher-order change processes, e.g. people moving into the area to capitalize on the SGD project as a whole.

- the efficacy of mitigation measures proposed (these play an important role in the process of I&APs re-appraising the initial change processes).

Figure 1: Social Impact Assessment: Process Definition



As Vanclay (2002) correctly points out:

> "if 'social impact' refers to the impacts actually experienced by humans (at individual and higher aggregation levels) in either a physical or cognitive (perceptual) sense, then many impact variables commonly measured in SIA studies—for example, population growth, presence of construction workers, etc.—are *not impacts but change processes that lead to impacts"* (my emphasis). An increase in population or the presence of strangers, are not the 'felt' impacts. Instead, the impacts that will likely result from these change processes are changed perceptions about the nature of the community (communityness, community cohesion), changed perceptions

[7] Carver, Scheier, and Weintraub (1989).

about personal attachment to the community, and possibly annoyance and upsetness as a result of the project" (pp.191ff).

In view of the above, it is more appropriate to view the variables below as change processes which are assessed in terms of their potential to create social impacts. The process of determining I&APs' perceptions and attitudes commensurate with the AW related change processes; the characteristics of the community; and other information, allows for social impacts to be determined. The following impact variables were applied:

- **Population related change processes and associated impacts**, including population change, and the inflow of temporary workers.
- **Individual and family level change processes and associated impacts**, including disruption in movement patterns, disruption in social networks; tourism and leisure impacts; and relocation of individuals and families.
- **Socio-economic change processes and associated impacts:** job creation; impacts on local businesses; and SMME development.
- **Public health, safety and security related change processes and associated impacts**
- **Community/institutional arrangements' related change processes and associated impacts**, including attitude formation, interest group activity, local government related impacts (size and structure).
- **Community infrastructure related change processes and associated impacts,** including change in community infrastructure, land acquisition and disposal.
- **Intrusion related change processes and associated impacts**, including air pollution, noise pollution, light pollution, visual pollution and malodour pollution.

2.4.4 Change processes and impact Focal Points

Change process/impact focal points are indicated under each of the impact assessment variables, denoting where the particular change processes and the assessed impact are likely to be concentrated.

2.4.5 Assessment and Rating of Impacts

To ensure uniformity across the various specialist studies and to facilitate comparison of impacts, the following rating approach was used:

i. Significance Rating Scale

The significance scale embraces the notion of extent and magnitude, but does not always clearly define these since their importance in the rating scale is relative. The significance scale is always indicated in CAPITAL letters. This scale included the following:

- **VERY HIGH:** Of the highest order possible within the bounds of impacts which could occur. In the case of adverse impacts: there is no possible mitigation and/or remedial activity, which could offset the impact. In the case of beneficial impacts: there is no real alternative to achieving this benefit.
- **HIGH:** The impact is of substantial order within the bounds of impacts, which could occur. In the case of adverse impacts: mitigation and/or remedial activity is feasible but difficult, expensive, time-consuming or some combination of these (and could give rise to 2nd order impacts). In the case of beneficial impacts: other means of achieving this benefit are feasible but they are more difficult, expensive, time-consuming or some combination of these.
- **MODERATE:** The impact is real but not substantial in relation to other impacts, which might take effect within the bounds of those, which could occur. In the case of adverse impacts: mitigation and/or remedial activity are both feasible and fairly easily possible. In the case of beneficial impacts: other means of achieving this benefit are about equal in time, cost, effort, etc.
- **LOW**: The impact is of a low order and therefore likely to have little real effect. In the case of adverse impacts: mitigation and/or remedial activity is either easily achieved or little will be required, or both. In the case of beneficial impacts: alternative means for achieving this benefit are likely to be easier, cheaper, more effective, less time consuming, or some combination of these.

- **VERY LOW:** The impact is negligible within the bounds of impacts that could occur. In the case of adverse impacts: almost no mitigation and/or remedial activities are needed, and any minor steps which might be needed are easy, cheap, and simple. In the case of positive impacts: alternative means are almost all likely to be more beneficial, in one or a number of ways, than those that the project is expected to accrue.
- **NO IMPACT:** No impact exists at all - not even a very low impact.

Two additional categories were also applied, used where relevant. These are in addition to the category represented on the scale, and if used, will replace the scale:

- **CAN'T KNOW:** The consultant believes an assessment is not possible even with additional research.
- **DON'T KNOW:** The consultant cannot make an assessment given available information.

ii. **'Temporal' of Time Scale**

The following temporal or time scale (which is always underlined) was used:

RATING	DESCRIPTION
Intermittent/Sporadic (Spor.)	The impact is anticipated to occur sporadically or intermittently.
Short-term (S.T)	The impact identified will operate for the duration of the construction phase (proposed projects; other developments) or a period of less than 5 years, which ever is the greater.
Long-term (L.T.)	The impact identified will operate for the duration of life of the SGD/AW.
Permanent (Perm).	The impact will be permanent.

iii. **Certainty Scale**

- **Definite:** The impact will definitely occur (free of all ambiguity).
- **Probable:** The impact will probably occur (supported by evidence strong enough to establish presumption but not proof).
- **Possible:** It is possible that the impact will occur, i.e. it may or may not occur.
- **Unlikely:** The impact is not likely to occur.

iv. **Spatial Scale**

The following spatial scale (always in *italics*) was used:

RATING	DESCRIPTION
Global	The impact is expected to be of global extent.
National	The impact is expected to be felt at the national level.
Regional (Reg.)	The spatial scale is expected to be felt at a regional scale, here defined as ranging from the Midlands Meander region to the province as a whole.
Local (Loc.)	The impact is expected to affect an area of 5-15km from any given point of the project area/site.
Site	The impact is expected to affect an area no bigger than the immediate project site.

v. **Direction of Impact**

Impacts are rated as either positive or negative.

vi. **Cumulative Impacts**

For purposes of this study, cumulative impacts are defined as the incremental impacts of an action, i.e. the AW added to past, present, and reasonably foreseeable future actions. This process is informed by the baseline analysis and projection.

3. SOCIAL IMPACT ASSESSMENT (SIA)

The change processes and associated impacts are relevant to the construction/ decommissioning and operational phases, respectively, of the proposed AW project. Compared to the construction process, decommissioning is expected to generate similar change processes and impacts as described in the forthcoming sections.

3.1 POPULATION RELATED CHANGE PROCESSES / IMPACTS

Context:

- **This variable serves as a basis to assess:** Any impacts on the populations that are anticipated to be a consequence of the AW.
- **Thumbnail[8] sketch of baseline conditions:**
  - **Population growth:** 5-%-6% (uMngeni and Mpofana Municipal areas, respectively);

[8] For further socio-economic data refer to Appendix B (separate report).

- **Population size** (Census, 2001): 36 820 (Mpofana Municipal Area: site of the proposed Spring Grove Dam and origin of the AW); 73 896 (uMngeni Municipal area: site of the break pressure tank and origin of the outfall servitude);
- **Employment:**
  - 39.5% of the population in the Mooi Mpofana Municipality is employed, whilst 31.3% is unemployed and 29% is economically not active. According to the 2001 Census Data, South Africa's employment rate is estimated at 34% and unemployment rate at 24%. 42% were not economically active (2001 Census data).
  - 44% of the population between the ages of 15-65 years in the Umngeni Municipality is employed, whilst 23% is unemployed and 32% is not economically active (2001 Census data).
- **Tourism:** The Natal midlands region is considered a significant tourism hub within the KZN province.
- **Housing developments in the study area (KZN Dept. of Housing: 2005-2007 Projections):**
  - Mpofana Municipality: Kamberg (220 sites); Rosetta (120 sites);
  - Umngeni Municipality: Nottingham Road (400 sites).

3.1.1 Inflow of job seekers

i. Construction Phase

(a) Nature and extent of change process and impacts

This variable revolves around the inflow of job seekers attempting to secure employment at the proposed MMTS-2 project: SGD/AW. Whilst such inflow is expected from surrounding areas and the province as a whole, foreign job seekers are also anticipated. Research[9] shows that economic factors play a role in the migration of people from countries such as Mozambique, Zimbabwe and Lesotho[10] to South Africa to seek employment, secure a higher living standard and capitalize on economic prospects. Current indications[11] are that some 500 people will be involved in the construction of the proposed Spring Grove Dam and AW. Even if it is the intent of the DWAF appointed contractors to source construction workers

[9] Solomon, 1996.

[10] A settlement at Rosetta is apparently occupied mostly by illegal immigrants from Lesotho.

[11] Project Information Video shown at 1st Public Meeting, 16 April 2007.

locally, it is unlikely to discourage people from elsewhere entering the area. It is this perceived prospect of employment opportunities, fuelled by potential rumours about the number of jobs to be created that would attract outsiders. Furthermore, introducing job opportunities into a resource-starved environment (see unemployment figures) is a potential source of competition between unemployed locals - a situation that would be exacerbated by outsiders, potentially resulting in conflict – the felt impact of the change process. From the perspective of criminals, a construction project of this nature (proposed Dam and AW) would mean opportunities to ply their 'trade', a concern raised by the Nottingham Rd. SAPS and CPF.

(b) Cumulative Impacts

For purposes of this study, cumulative impacts are defined as the incremental impacts of an action, i.e. the proposed MMTS-2: AW project added to past, present, and reasonably foreseeable future actions.

The planned new developments (applications received), some of which appear to be emerging on the back of the proposed Spring Grove Dam[12], are considered to be relevant as "present and foreseeable future actions". Many are high income residential and tourism developments and the total of *1950* units (and growing) is considered sizable (IDP, January 2005). These are considered associated cumulative impacts which can be added to the MMTS-2: AW and are expected to create an even greater impetus for job seekers to enter the area in search for employment.

This variable has been rated as follows:

> **Degree of certainty:** Probable; **Significance:** HIGH; **Direction:** negative; **Time-scale:** short-term; and **Spatial scale:** *local.*

The following considerations serve as motivation for the rating:

- The unemployment rate in the Mpofana Municipal area (IDP Review, February 2006), which incorporates Mooi River and Rosetta (situated only kilometres from the proposed project). (Unemployment and poverty were also cited as the main objectives in the uMngeni Municipality Integrated Development Plan (January,

[12] According to input from I&APs.

2005)).

- The magnitude of the Spring Grove Dam and associated AW (total cost in excess of R 350 000 000[13]);
- Cumulative or second-order impacts arising from developments set to capitalise on the proposed SGD in general and the residential/commercial boom specifically.

(c) Change process and impact Focal Points

The following are considered the impact focal points:

- primarily the mooted dam site-office and material storage area from which construction activity is to be managed – probably Springvale 233 and Springvale 234;
- any other construction area, e.g. construction camp(s) and site offices along the Spring Grove raising main alignment (up to and including the Mearns rising main); the break pressure tank at Gowrie; and the Mpofana outfall; and
- settlements (e.g. Mooi River Township; Rosetta 'informal' settlement: currently about 36 inhabitants) which would serve as accommodation areas for newcomers and allow convenient access to the proposed project site;
- private properties, farms and businesses.

(d) Mitigation

The following mitigation measures could be considered:

- An ongoing, broad-based information campaign to clarify the contractor's intent to source labour locally (both during construction and operation). Local community-based structures should be engaged in dissemination information in this regard.
- A transparent recruitment drive aimed at locals, including existing SMMEs and notably HDSAs.

[13] Project Information Video shown at 1st Public Meeting, 16 April 2007.

(e) Post mitigation impacts

In anticipation of the successful implementation of the mitigation measures above, the rating can be adjusted as follows:

> **Degree of certainty:** Probable; **Significance:** MODERATE; **Direction:** negative; **Time-scale:** short-term; and **Spatial scale:** *local.*

Note: Mitigation of impacts related to the AW is the primary consideration of the project proponent/appointed contractors. Therefore, such measures are not expected to mitigate cumulative impacts related to other projects, even though these may arise in anticipation of the Spring Grove Dam/AW.

ii. Operational Phase

In terms of the operational phase of the AW, the rating for the variable, *'inflow of job seekers'* has been adjusted as follows.

> **Degree of certainty:** Possible; **Significance:** VERY LOW; **Direction:** negative; **Time-scale:** sporadic/intermittent and **Spatial scale:** *local.*

The main motivation for this rating is that except for perceived employment prospects commensurate with maintenance, the MMTS-2: AW not expected to attract newcomers into the area. Maintenance is expected to be undertaken by existing DWAF personnel or one of their contractors. Therefore, employment prospects are expected to be extremely limited.

iii. Decommissioning Phase

Decommissioning of the AW is not expected to attract newcomers into the area at a level similar to the construction process, given that employment prospects would be more limited.

The variable, *'inflow of job seekers'* has therefore been adjusted as follows.

> **Degree of certainty:** Possible; **Significance:** LOW; **Direction:** negative; **Time-scale:** short-term and **Spatial scale:** *local.*

If required, mitigation measures proposed above can be applied.

3.1.2 Changes in the age, gender, racial or ethnic composition of the population

i. Construction Phase

(a) Nature and extent of change process and impacts

An inflow of people from other countries in search of employment, rather than locals from surrounding communities and rural areas would be the main change process under this variable. If locals perceived this inflow as adverse and a destabilising factor, or if conflict between residents and newcomers results, this change would qualify as impacts. Due to reported[14] hostility by locals against them, communities of foreigners have been established largely along national lines, and do not span nationality divisions. They exist as discrete networks, representing particular nationalities. These communities serve the purpose of safe havens and comfort zones for them. "Company and mutual protection, rather than long-term assimilation, are the central criteria for these local migrant communities. There is no permanence or long-term stability about them". This lack of assimilation of foreigners into local communities has adverse effects on the creation of social capital[15] - described as the 'glue that holds a community together'. Social capital includes a person's membership of groups and institutions, ability to access authorities such as local government and social networks, including religious participation with others. A favourable relationship exists between social capital and lower crime rates[16]. It is a crucial ingredient in producing safe, happy, and productive communities[17]. Since 1980, more than 10.3 million foreigners entered South Africa legally but did not depart/declare their departure. The number of foreign stayers is now at over 85,000 per month from 65,000 last year and 44,000 in 2000. The SA population growth per month is only 41 000. Consequently, there are twice as many foreign stayers than South Africans[18].

[14] Harris, 2002.

[15] Social capital consists of networks and norms that facilitate collective action. The dimensions of social capital include horizontal kinship or professional ties, as well as vertical ties that enable interactions with authorities (Woolcock, 1998, pp.151-208).

[16] Palmary, September, 2004.

[17] Woolcock, M. 1998.

[18] Schüssler, 2006.

Whilst the exact figures and consequent changes in the composition of the population associated with the project cannot be determined, even with further research, the following rating accrues based on the discussion above:

Degree of certainty: Probable; **Significance:** HIGH; **Direction:** negative; **Time-scale:** short-term; and **Spatial scale:** *local.*

(b) Change process Focal Points

Those individuals entering the area form elsewhere are likely to seek accommodation in areas which would allow easy access to the main construction terrain/site of the proposed dam wall (being Springvale property 02170/233). Proliferation of informal housing due to existing affordable housing shortages cannot be precluded.

(c) Mitigation

The following mitigation measures could be considered:

- An ongoing, broad-based information campaign to clarify the contractor's intent to source labour locally (both during construction and operation). Local community-based structures should be engaged in dissemination information in this regard. (Identity documents alone should not be accepted as proof, give reports that the Department of Home Affairs is "leaking ID documents")[19].
- A transparent recruitment drive aimed at locals, including existing SMMEs and notably HDSAs.
- A recruitment drive aimed at legitimate foreigners with scarce skills (see Dept. of Home Affairs quotas).

(d) Post-Mitigation Impacts

Subject to the successful results of the implementation of the mitigation measures above, the rating can be adjusted as follows:

Degree of certainty: Probable**; Significance:** MODERATE; **Direction:** negative, **Time-scale:** short-term, and **Spatial scale**: *local.*

[19] Schüssler, 2006.

ii. Operational Phase

In terms of the operational phase of the AW, the rating for the variable, *'changes in the age, gender, racial or ethnic composition of the population'* has been adjusted as follows.

> **Degree of certainty:** Unlikely; **Significance:** VERY LOW; **Direction:** negative; **Time-scale:** permanent and **Spatial scale:** *local.*

The main motivation for this rating is that operation and maintenance of the AW would not be of a magnitude sufficient to bring about population change processes and associated impacts described under 'construction phase' above.

iii. Decommissioning Phase

Decommissioning of the AW is not expected to attract newcomers into the area at a level equal to the construction process, given that employment prospects would be limited. Hence, population change process and resulting impacts are expected to be low.

The variable, *'changes in the age, gender, racial or ethnic composition of the population'* has therefore been adjusted as follows.

> **Degree of certainty:** Possible; **Significance:** LOW; **Direction:** negative; **Time-scale:** short-term and **Spatial scale:** *local.*

If required, mitigation measures proposed above can be applied.

3.1.3 Relocation of individuals or families

i. Construction Phase

(a) Nature and extent of change process and impacts

According to hr Africa Consulting (January, 2004, p.32), the rising main, shortly after crossing district road (D146), will pass through a labour accommodation area. Farm laborers and their families are living in this area and would have to be relocated. The more subjective considerations such as the adaptive and coping capacity of the affected workers are difficult to assess prospectively. However, the stress (impact) experienced commensurate with the relocation related change process, would be a function of:

- individual vulnerability, resilience and coping capacity/strategies;
- whether the process of relocation is congruent or incongruent with personal needs and expectations (current and prospective); and
- the context and associated stressors, e.g. characteristics of the new environment, including similar or different accommodation (size and quality); distance to work, shops; and access to places of worship and existing social networks.

This variable has therefore been rated as follows:

Degree of certainty: Probable; **Significance:** HIGH**; Direction:** negative; **Time-scale:** short-term; and **Spatial scale:** *local.*

(b) Mitigation

The following mitigation measures are recommended:

- mitigation by avoidance: routing the rising main pipeline within the servitude in a manner that would prevent farm worker accommodation to be affected. If this is practicable, relocation related impacts would not manifest.
- relocation of the affected farmer workers to alternative suitable accommodation which will offer security of tenure. Such relocation should take place in consultation with the affected parties to ensure that the process is informed by specific needs/constraints and socio-economic considerations, including social networks.
- compensation for losses incurred in line with DWAF compensation policy. Such compensation should go beyond monetary compensation and include options that provide access to opportunities, including:
    - facilitating access to new housing, including providing assistance in drawing-down provincial housing subsidies for those that meet the eligibility criteria;
    - compensatory land;
- dissemination of information on organizations that could provide counseling or support (e.g. Life Line, KZN; Church groups) to help mitigate the psychological impacts of relocation, including occupational change and loss of employment / income as well as sense of place. The manner in which the process of expropriation is approached will play an important role in either attenuating or exacerbating these impacts. A process approach taken should reflect empathy

and understanding on behalf of the project proponent for the losses faced by affected parties, rather than just hammering-out the technical aspects and arriving at outcomes.

(c) Post mitigation impacts

The relocation related impacts should respond favorably to mitigation, at least as far as the tangible considerations are concerned. Following successful mitigation, the rating can be adjusted as follows:

> **Degree of certainty:** Probable (nil if avoided); **Significance:** MODERATE (NO IMPACTE if avoided); **Direction:** negative; **Time-scale:** short-term; and **Spatial scale:** *local.*

In the case of avoidance, i.e. by routing the rising main in a manner so as not to affect accommodation, the impact would be nil.

ii. Operational Phase

No relocation related impacts would manifest during the operational phase of the AW.

iii. Decommissioning Phase

No relocation related impacts would manifest during the decommissioning phase of the AW.

Table 1: Summary Table of Population Impacts: Construction Phase

Impact Variable	Certainty		Significance		Direction (+;-)		Time Scale		Spatial Scale	
	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.
Changes in population composition	Probable	Probable	HIGH	MOD.	-	-	S.T.	S.T.	Loc.	Loc.
Inflow of job seekers	Probable	Probable	HIGH	MOD.	-	-	S.T.	S.T.	Loc.	Loc.
Relocation of individ./ families	Probable	Probable	HIGH	MOD.	-	-	S.T.	S.T.	Loc.	Loc.
Relocation of individ./ families	Nil (if (avoided)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

KEY: MOD.= Moderate; + (Positive); - (Negative); S.T.= Short-Term; Loc.=Local; Reg.=Regional.

Table 2: Summary Table of Population Impacts: Operational Phase

Impact Variable	Certainty		Significance		Direction (+;-)		Time Scale		Spatial Scale	
	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.
Changes in population composition	Unlikely	N/A	VERY LOW	N/A	-	-	S.T	S.T.	Loc.	Loc.
Inflow of job seekers	Possible	N/A	VERY LOW	N/A	-	-	Sporadic/ Intermittent	N/A		
Relocation of individ./ families	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

KEY: Pre-Mt.= Pre-mitigation; Post-Mt.= Post-Mitigation.

Table 3: Summary Table of Population Impacts: Decommissioning Phase

Impact Variable	Certainty		Significance		Direction (+;-)		Time Scale		Spatial Scale	
	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.
Changes in population composition	Possible	N/A	LOW	N/A	-	-	S.T	S.T.	Loc.	Loc.
Inflow of job seekers	Possible	N/A	LOW	N/A	-	-	S.T.	N/A	Loc.	Loc.
Relocation of individuals / families	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

3.2 INDIVIDUAL AND FAMILY LEVEL CHANGE PROCESSES / IMPACTS

Context:

- **This variable seeks to assess:** Any impacts attributed to the AW which will have an impact at the level of families and individuals.
- **Thumbnail sketch of baseline conditions:**
  - **Road infrastructure:** The R103 parallel alternate route to the N3 is in need of maintenance[20]. Other district roads of importance in terms of the AW are gravel. According to an I&AP, trucks traverse local roads (e.g. R103) to avoid toll-fees on the N3.
  - **Traffic volumes:** High on the R103.
  - **Safety and Security:** In summary, it is evident that, in the case of:
    - **Mooi River**, crime (across categories) has *decreased* from 2001-March 2006.
    - **Rietvlei:** crime (across categories) has generally *increased* from 2001-March 2006. This includes those crimes that have been discussed in the assessment below, i.e. burglary at business and residential premises; robbery and stock theft.
    - **Nottingham Road,** crime (across categories) has generally *increased* from 2001-March 2006. This includes those crimes that have been discussed in the impact assessment below, i.e. burglary at business and residential premises; robbery and stock theft.
    - **Latest statistics:** According to the Centre for Justice and Crime Prevention[21], the countryside is more dangerous than cities, noting that "in KZN, few murder occur in the Durban City centre, compared with the Midlands…".

[20] KZN Department of Transport (2004). White Paper on Freight Transport Policy.

[21] Sunday Times, 22 April 2007.

3.2.1 Change processes and impacts related to daily movement patterns

i. Construction Phase

(a) Nature and extent of change processes and impacts

In terms of impacts on daily movement patterns, a number of roads are of particular importance as change process focal points relating to daily population movement:

- **District road D146 (gravel),** which the pipeline will cross upon exiting the pump-station at the Spring Grove dam. Road D146 (very narrow toward the R103) feeds into Kamberg Road at a T-junction close to Rosetta Village as well into Road 103 (connecting Rosetta and Nottingham Village). It is anticipated that construction vehicles would exit at Road D146 travel a few meters down/alongside Road 103 towards Rosetta Village and then turn right across Road 103 into a gravel road leading up to the proposed Quarry site. This gravel road passes under the railway line. Houses are situated alongside this gravel road.
- **District Road D682 (parallel with D146),** which the pipeline will traverse. A number of properties are situated alongside this road. Off the D682 is a narrow, one lane road, ending at the property "Mallorca". Twenty residential properties are apparently situated on this road. According to an I&AP, the entry-point from the side-road is steep and slippery and children use a footpath at the end of the road to go to school.
- **Road 103 (asphalt)** (which connects Rosetta and Nottingham Road/N3 highway) and the existing rail link, which the pipeline will cross, requiring a pipe jack (poor condition and narrow).
- **The haul road to and from the quarry across the R103 and via the D146.**
- **The N3 Toll 125 (gravel)**, which the outfall pipeline will cross just before terminating in the Mpofana outfall.
- **The internal roads at Gowrie Estate** and notably those which cross the existing outfall servitude from the break pressure tank.

In terms of daily movement-related changes processes, the following are pertinent:

- Change processes resulting from the construction of the rising main and outfall sewer alignments across or underneath roads (notably D146; Road 103), requiring temporary road closures and/or construction of temporary detours.
- Change processes resulting from construction vehicles accessing, crossing and using roads during construction of the rising main and outfall pipeline, resulting

in a disruption of traffic (notably Road 103 (including the section from Nottingham Road to the N3 highway; D146; D682 and side-road)). One I&AP calculated that at an average speed of 30km/h a return trip via the Kamberg Rd. including loading and offloading would take: 15mins. + 12mins. + 5mins. +12mins. For a total of 44 minutes which equates to a total of 16 round trips per day or 32 movements per day on the R103.

The disruption of daily movement patterns (the impact) on the roads mentioned, as a result of change processes associated with construction, would obtain in the case of: **(1)** the general population, e.g. individuals on their way to work; parents taking children to school; children walking to school; or people on their way to local towns and beyond; **(2)** tourists visiting/traversing the area; and **(3)** businesses taking their products to market.

Impacts would present differentially for the above groups, ranging potentially from a mere nuisance factor to more serious ramifications where deadlines play a role or goods are being transported. In the words of one I&AP: "Many of our local residents run home-based businesses, some of whom are situated on or in close proximity to the access routes. These residents will inevitably suffer financial loss by reduction of business through current and potential customers not being able to get to the premises concerned, as well as financial losses due to increased wear and tear on their vehicles caused by the possible deteriorating road infrastructure".

(b) Cumulative Impacts

The planned new developments (applications received), some of which appear to be emerging on the back of the proposed Spring Grove Dam[22], are considered to be relevant as "present and foreseeable future actions". Many are high income residential and tourism developments situated in the uMngeni Municipal area and the total of *1950* units is considered sizable (IDP, January 2005). Noteworthy is the Gowrie Farm Fly Fishing Estate, which comprises[23]:

- a nine-hole golf course and a golf clubhouse facility;
- 125 residential sites;

[22] According to inputs from I&APs.

[23] Venn Nemeth & Hart Inc. (26/1/2006) Gowrie Farm Golf and Fly Fishing Estate, Agreement of Sale.

- home owner's amenities, including a swimming pool, tennis courts, squash court and stables;
- the use of the existing dams for fly-fishing;
- an operating farm;
- 54 workers cottages, 14 of which will be retained for staff working on the estate and 40 of which shall be sold to members of the local community (external to the estate) who are entitled to housing subsidies.

The above and other developments are considered change processes that can manifest as cumulative impacts when added to the AW. They are anticipated to intensify daily movement related impacts, should construction of these developments and the AW occur concurrently.

This variable has been rated as follows:

> **Degree of certainty:** Definite; **Significance:** HIGH; **Direction:** negative; **Time-scale:** sporadic; and **Spatial scale:** *local.*

The following serve as key motivations for this rating:

- Roads earmarked for use by construction vehicles and/or construction of the rising main and outfall sewer pipelines serve as main access roads to and from surrounding farms; residential properties and businesses;
- Road 103 from Nottingham Road to Rosetta roads has high traffic volumes and is not in a good condition (potholes; large gap between road surface and gravel shoulder, already posing a safety risk).

(c) Mitigation Measures

The following mitigation measures, which are expected to intervene between the change processes and impacts, are recommended:

- Construction of the rising main and outfall pipelines across or underneath roads should ideally take place outside peak traffic periods;
- Where temporary road closures are inevitable, the dates and times should be sign-posted well in advance at the entrances and exists of the affected roads, and alternative routes indicated;
- Where construction is expected to take a period of time, suitable and safe detours should be created.

- Interaction with the relevant roads agencies and local government to discuss measures to improve the R103 before, during and after construction of the AW/SGD.
- Points-men/women should be deployed to direct the traffic, where single lanes of roads remain operational or where construction vehicles need to access or cross roads. This is of particular importance in the following instances:
    - where district road D146 meets Road 103 and Kamberg Rd., and which construction vehicles are anticipated to cross to access the gravel road leading to and from the quarry site;
    - where the rising main pipeline exits the pump-station, crossing district road D146;
    - where the rising main pipeline is planned to cross Road 103 and the railway line;
    - where the rising main pipeline links into the break pressure tank at Gowrie Estate.

(d) Post mitigation impacts

The impacts relating to daily movement patterns should respond favorably to mitigation, at least insofar they relate to the AW. Following successful mitigation, the rating can be adjusted as follows:

> **Degree of certainty:** Probable; **Significance:** MODERATE; **Direction:** negative; **Time-scale:** sporadic/intermittent; and **Spatial scale:** *local.*

Note: Mitigation of impacts related to the AW is the primary responsibility of the project proponent/contractor. Therefore, such measures are not expected to attenuate cumulative impacts (see above) associated with other projects.

ii. Operational Phase

In terms of the operational phase of the AW, the rating for the variable, *'impacts on daily movement patterns',* has been adjusted as follows.

> **Degree of certainty:** Probable; **Significance:** VERY LOW; **Direction:** negative; **Time-scale:** intermittent/sporadic and **Spatial scale:** *local.*

The main motivation for this rating is that maintenance to be undertaken will be sporadic/intermittent and not have a significant impact on daily movement patterns.

iii. Decommissioning Phase

Decommissioning of the AW is expected to impact daily movement patterns in a manner similar to those anticipated during construction process. This variable has therefore been adjusted as follows.

> **Degree of certainty:** Probable; **Significance:** MODERATE (LOW: Post-mitigation); **Direction:** negative; **Time-scale:** short-term and **Spatial scale:** *local.*

The same mitigation measures proposed under 'construction' should be applied.

3.2.2 Perceptions about public health, safety and security

i. Construction Phase

- **Nature and extent of change processes and impacts**

A central change processes associated with the construction and decommissioning process of the AW is the presence of contracting firms and construction workers, (as well as construction equipment and vehicles), usually accommodated in construction camps This may include 'legitimate' workers (who could also operate as 'insiders') as well as opportunists and professional burglars/robbers posing as construction workers. In the words of the SAPS Station Commander: Nottingham Rd.: "My concern is the increase in possible crimes as there will be opportunity. There is precedent with smaller construction projects where crime has increased. The bigger the project, the more opportunity, the more people involved, increased amounts of cash for payroll and so on, could result in a crime increase".

Construction camps may be frequented by local sex workers, a change process with a bearing on health impacts. As a CPF representative noted: "the Construction firms need to keep a tight rein on their workers with proper ID and accommodation. There is a high probability that with wages coming in there will be dagga, shebeens, Shimewane (a dangerous home brew) and prostitution as well. Opportunistic theft could increase in the area as well".

From a perspective of focal points, this change process would manifest along the full length of the rising main pipeline, outfall pipeline, pump-station at the dam; the break

pressure tank at Gowrie Estate, the outfall works at the Mpofana river as well as the location of the gauging weirs. Construction workers would have to access private properties, including those traversed by the existing Mearns servitude as well as public and private roads.

The main impacts associated with this change process include:

- **Safety and security impacts, including, but not limited to:**
  - burglary and/or armed robbery at private and commercial locations, including the construction sites (e.g. theft of heavy construction equipment and materials); farms (e.g. theft of life-stock; agricultural produce; and farming equipment).
  - vandalism at construction sites;
  - accidents involving construction vehicles, impacting pedestrians and motorists (the R103 and D146 into Kamberg Rd. and the R 103 to access the quarry site) are considered impact focal points);
  - accidents on construction sites such as persons falling into open trenches;
  - the practices of construction workers (cooking/heating; stray matches and cigarettes) thus creating a potential for stray fires.

- **Public health impacts:**
  - The presence of contractors and construction camps is associated with a number of social and environmental problems, particularly in the case of inadequate construction camp management practices. Such problems can include the erection of informal dwellings and allied problems such as lack of water, sanitation and waste disposal infrastructure, with resultant environmental pollution and health impacts. During the rainy season, surface water run-off can result in faeces being washed into streams, posing health risks elsewhere. These problems can be exacerbated in the event of an in-migration of job-seekers from elsewhere, who may set-up informal dwellings in the vicinity of the construction camps.
  - An increase in sexually transmitted infections (STIs) and HIV/AIDS is considered a tangible risk associated with construction camps, also bearing mind that KwaZulu-Natal, has one of the highest levels of

HIV/AIDS infection in the world[24]. This impact has two dimensions in that contractors can infect sex workers and *vice versa*. At a secondary impact level, workers whose health is failing due to being infected, will be less productive and unable to carry out physically demanding (e.g. construction related) jobs. Employers may increase the size of the workforce to compensate for absent workers and hence payroll costs will rise[25].

(b) Cumulative Impacts

The planned new developments (applications received), some of which appear to be emerging on the back of the proposed Spring Grove Dam, are considered to be relevant as "present and foreseeable future actions". Many are high income residential and tourism developments situated in the uMngeni Municipal area and the total of *1950* units (and growing) is considered sizable (IDP, January 2005). The above and other developments are considered change processes that can manifest as cumulative impacts when added to the AW. They are anticipated to intensify public health, safety and security related impact, should construction of these developments and the AW occur concurrently.

Furthermore, according to an I&AP living on a narrow, 1-lane side road off the D682 (cul-de-sac at Mallorca), the turning point (from the R103) into the latter is steep, slippery and dangerous (there is a blind bend). Trucks make use of the road (R103) to avoid tolls. There have been 5 fatalities here, including a policeman. The trucks drive over the white line when going around the sharp bends and cause accidents. There is a footpath which children use to go to and from school. Should the road be used by construction vehicles, cumulative impacts in terms of public health and safety would results.

[24] Health Economics and HIV/AIDS Research Division, University of Kwa-Zulu/Natal.

[25] Ibid.

Bearing in mind cumulative impacts; the magnitude of the project, as well as the high unemployment and crime rates, this variable has been rated as follows:

Degree of certainty: Probable; **Significance:** HIGH; **Direction:** negative; **Time-scale:** sporadic/intermittent; and **Spatial scale:** *local.*

(c) Mitigation Measures

The following mitigation[26] measures are proposed:

- **Safety and Security Impacts**
  - Contractors appointed by DWAF should screen prospective employees and subcontractors, including criminal background checks. Constractors should clarify, emphasize, and enforce rules that prohibit the taking of construction tools, materials, and private property.
  - Marking property with identification helps control burglary in three ways: (1) it warns burglars that owners are monitoring their property; (2) it discourages potential buyers of stolen property; and (3) it increases the probability that recovered property will be returned to its rightful owner.
  - Properly constructed and secured fences can control access to construction sites. Temporary wire fencing may be the most appropriate and cost effective for larger construction sites.
  - Workers should be urged to recognize and report suspicious activity and signs of burglary and be informed of crime prevention measures that they themselves can take. This would include closing farm and residential gates; and refraining from cutting locks on gates not authorized for access to construction sites.
  - All construction workers should wear clothing (and reflective vests) marked with the logo of the construction firm/contractor or sub-contractor as well as identification cards that cannot be easily forged, so that they can be easily recognised as being legitimate.
  - Sound design and servitude management practices should be applied to minimise impacts. A fire/emergency management plan is to be developed proactively in consultation with local Municipalities. Access roads could

[26] Adapted from Boba & Santos, 2006.

serve as firebreaks and potential “high fire risk” vegetation types should be removed.

- Contractors should be urged to sustain a consistent workforce that is familiar with their rules, practices, and attitudes toward misappropriation of property. Those who use subcontractors who in turn hire other builders are likely to be at a higher risk of being burglarized.
- Farm and home-owners should secure their properties bearing in mind that in planning their crimes, burglars and robbers consider accessibility cues (for example, how well the site is protected by doors, fences, or locks).
- Prominently and strategically displayed signage can inform potential burglars that builders, residents/commercial businesses and police are working jointly to reduce crimes.
- Red, flashing warning lights would be placed on the R103 at the point where the D146 may be crossed by construction vehicles from the dam site to access the quarry. (This would alert motorists, also during periods of mist).
- Drivers of construction vehicles should be licensed and experienced in handling their machinery and cautioned to obey the rules of the road.
- Construction vehicle movement should be limited to off-peak periods on all major roads.
- All roads used for construction purposes should be maintained, e.g. kept free of pot-holes; sprayed with water regularly to suppress dust, which could impede visibility. The R103 seems to be under specific pressure, as it serves as a detour for trucks attempting to avoid N3 toll fees.
- Wages should be directly transferred into the accounts of workers rather than transporting cash to the construction site offices, so as to limit the potential for cash-in-transit heists and robberies.

- **Health Impacts**
  - The contractor should ensure that workers are educated on HIV/AIDS and that condoms are distributed within the construction camp. The contractor should be encouraged to liaise with the local health services to ensure

that their education/condom distribution programmes extend to the construction camps.

- Construction camp locations (e.g. closer versus distant) would have a potentially mitigating effect or at least modulate the intensity of the HIV/AIDS and STI impact.
- Construction camps should be equipped with waste disposal; bathroom and cooking facilities.

(d) Post mitigation impacts

The health, safety and security related impacts are expected to respond favorably to mitigation, at least insofar they relate to the AW. Following successful mitigation, the rating can be adjusted as follows:

> **Degree of certainty:** Possible; **Significance:** MODERATE; **Direction:** negative; **Time-scale:** sporadic/intermittent; and **Spatial scale:** *local.*

Note: Mitigation of impacts related to the AW is the primary responsibility of the project proponent/contractor. Therefore, such measures are not expected to attenuate cumulative impacts (see above) associated with other projects or those attributable to opportunists not gainfully employed.

ii. Operational Phase

In terms of the operational phase of the AW, the rating for the variable, *'perceptions of public health, safety and security',* has been adjusted as follows:

> **Degree of certainty:** Possible; **Significance:** VERY LOW; **Direction:** negative; **Time-scale:** intermittent/sporadic and **Spatial scale:** *local.*

The main motivation for this rating is that maintenance to be undertaken will be sporadic/intermittent, but would require private properties being accessed along the servitudes. Moreover, given the difference in scope between maintenance related activity and construction, the impacts are not anticipated to be significant. However, mitigation measures proposed under 'construction phase' should be applied as a proactive measure.

iii. Decommissioning Phase

Given an expected reasonable level of worker activity to decommission the AW (should this be required in the future), this variable relating to public health, safety and security has been rated as follows.

> **Degree of certainty:** Probable; **Significance:** MODERATE (LOW: Post Mitigation); **Direction:** negative; **Time-scale:** sporadic/indicental and **Spatial scale:** *local.*

The impacts will be responsive to mitigation measures proposed under 'construction phase' above.

3.2.3 Impacts on tourism and recreational activities

i. Construction Phase

(a) Nature and extent of change processes and impacts

Change processes associated with the presence of construction workers and construction activities can create impacts:

- by altering the manner in which individuals *perceive* their recreational activities, including loss of privacy; the quality of the recreational process; interaction with others; and/or
- through felt, physical impacts, by impeding access to recreational facilities or impacting the recreational facilities themselves (thus preventing/limiting recreational activity); creating noise and dust as well as other intrusive impacts (which are also assessed under separate headings).

The above impacts are expected to manifest *differentially* along the corridor of the rising main (new servitude) and outfall pipeline (existing servitude); the breakwater tank at Gowrie and the measuring weirs, depending on land-use patterns; population density; and the type of recreational activities/facilities and the AW infrastructure in question. The impacts on recreational activities/facilities as described above and rated (see below) would be of particular importance in the following localities:

- Gowrie estate, affecting individual/family residences and the communal recreational activities. For example, upon exiting the break pressure tank, the outfall pipeline effectively traverses parts of Gowrie estate, necessitating construction activity on the doorstep of residences. If an

addition break pressure tank were to be built, this would interfere with the clubhouse and tennis courts[27].

- the rising main section from the pump-station (dam site) to the R103, which would affect a small number of occupants living on small-holdings (e.g. Springvale 233);
- the properties (e.g. Boschfontein 901) on which the rive flow measuring weirs are to be built;
- other properties used for recreational and tourism purposes, the execution of which may be affected by construction activities.

Note: Impacts on recreational activities or facilities that result from their being situated on the existing Mearns servitude beyond the break pressure tank and up to the Mpofana river (the outfall pipeline will be routed next to it), are excluded from this section. The reason is that the servitude vests in DWAF / S.A. and may not be interfered with[28]. Consequently, any resulting impacts cannot be attributed to the project proponent and/or contractor.

Bearing in mind the differential, locality dependent impacts described, this variable has been rated as follows:

Degree of certainty: Probable; **Significance:** MODERATE; **Direction:** negative; **Time-scale:** short-term; and **Spatial scale:** *local.*

(b) Mitigation Measures

The following mitigation measures are proposed:

- Break pressure tank at Gowrie: to prevent interference with the club house and tennis court, pursue the option of constructing one break pressure tank as opposed to two tanks. This should limit the construction foot-print. It should also be ensured that water leakages are prevented, as one affected party living in the Gowrie estate complained about water spilling over and into his property;
- Expedite the process of opening trenches; laying the pipelines and closing trenches, notably across Gowrie estate and the properties situated along the new servitude from the dam site to the R103;

[27] Keeve Steyn, 2004, p.44.
[28] Pers comm.., DWAF, January 2007.,

- Where construction activity would prevent access to recreational facilities, including golf courses and tennis courts, alternative routes should be provided;
- Where practicable, the routing of the rising main and outfall pipelines should be such that construction has a minimal impact on recreational facilities and/or the quality of recreational activities.
- Limit construction activities to working hours (preferably no work on Sundays);
- Urge workers not to intrude into properties, including peeking over walls; requesting water from domestic water supplies or using the toilet facilities on private / commercial properties.
- Limit intrusion impacts (visual; dust; noise), which could adversely affect the quality of residents' recreational activities. This should include strict adherence to, and enforcement of, speed limits and spraying of dirt roads and construction sites to suppress dust.

(c) Post mitigation impacts

The impacts on recreational facilities and activities fall well within the bounds of the mitigation measures proposed. Following successful mitigation, the rating can be adjusted as follows:

Degree of certainty: Probable; **Significance:** LOW; **Direction:** negative; **Time-scale:** short-term; and **Spatial scale:** *local.*

ii. Operational Phase

In terms of the operational phase of the AW, the rating for the variable, *'tourism and recreational activities',* has been adjusted as follows.

Degree of certainty: Possible; **Significance:** VERY LOW; **Direction:** negative; **Time-scale:** intermittent/sporadic and **Spatial scale:** *local.*

The main motivation for this rating is that maintenance to be undertaken will be sporadic/intermittent, but would require private properties being accessed along the servitudes. Impacts on tourism and recreational activities are therefore possible but not of great significance.

iii. Decommissioning Phase

Given an expected reasonable level of worker activity necessary to decommission the AW (should this be required in the future), the variable relating to *'tourism and recreational activities'* has been adjusted as follows.

> **Degree of certainty:** Probable; **Significance:** MODERATE (LOW); **Direction:** negative; **Time-scale:** short-term and **Spatial scale:** *local.*

3.2.4 Disruption of Social Networks

i. Construction Phase

(a) Nature and extent of change processes and impacts

Interference by construction workers/job seekers from elsewhere in local social networks can be considered a change process associated with the AW construction process. Impacts will result if:

- locals perceive this interference as adversely affecting the manner which they go about servicing their social networks, including how they relate to each other socially or in pursuit of religious and cultural practices / seek to fulfill their instrumental and/or emotional social support[29] related needs; and
- such interference and perceived impacts result in frustration or anger as well as potential conflict with newcomers.

Impact focal points could include Mooi River; the settlement currently housing illegal immigrants at Rosetta as well as smaller communities or homesteads accessible to the inhabitants of construction camps.

If present, the above impacts would adversely affect the creation of social capital (a crucial ingredient in producing safe, happy, and productive communities), bearing in mind that social capital derives from a person's membership of groups and institutions and social networks, including religious participation with others.

The above interference and resulting impacts manifesting would depend on a number of factors, including whether newcomers:

- are foreigners or S.A. nationals from elsewhere (other areas in the KZN province; other provinces). As noted previously, research shows that

[29] Instrumental support includes advice and assistance (including material assistance); social support is defined as moral support; sympathy and understanding.

foreigners exist as discrete networks and don't readily assimilate into local communities. If this research is correct, interference and impacts on social networks would therefore be more readily attributable to foreigners than S.A. nationals (newcomers) from elsewhere.

- will be able to secure employment or are already employed by the AW contractor(s), thus being able to meet their primary needs, e.g. shelter and food, thus not needing to interfere in existing social networks with the objective to secure instrumental support;
- will be in the area only to secure employment at the AW project (in the case of job-seekers) and leave if they are unsuccessful in doing so. (Construction workers who are part of a stable, permanent contractor workforce are expected to vacate the area following completion of the AW construction process).

Bearing in mind the above uncertainties, but given the importance of social capital for community safety and stability and the role of social networks in this regard, this variable has been rated as follows:

Degree of certainty: Possible; **Significance:** HIGH; **Direction:** negative; **Time-scale:** sporadic/intermittent; and **Spatial scale:** *local.*

(b) Mitigation Measures

In the case of the variable 'disruption of social networks', mitigation is anticipated to be difficult, but probably more achievable in terms of a stable workforce already employed by, or yet to be employed by the contractor(s) to be appointed by DWAF. The contractor would be able to put in place certain rules and regulations with the objective to prevent interference in local social networks. However, mitigation would fall outside the purview of the contractor(s) in the case of disruption of social networks by newcomers in search of employment at the AW.

(c) Post mitigation impacts

Bearing in mind that mitigation measures would apply only to the workforce:

Degree of certainty: Possible; **Significance:** MODERATE; **Direction:** negative; **Time-scale:** sporadic/intermittent; and **Spatial scale:** *local.*

ii. Operational Phase

In terms of the operational phase of the AW, the rating for the variable, *'impacts on social networks',* has been adjusted as follows.

> **Degree of certainty:** Unlikely; **Significance:** VERY LOW; **Direction:** negative; **Time-scale:** intermittent/sporadic and **Spatial scale:** *local.*

The main motivation for this rating is that maintenance to be undertaken will be sporadic/intermittent. Maintenance teams are not expected to stay in the area long enough to interfere in social networks.

iii. Decommissioning Phase

A reasonable level of worker activity is expected to be necessary to decommission the AW (should this be required in the future). The activity (change process), however, is not expected to be on-par with that of the construction phase. Consequently, the variable relating to *'impacts on social networks',* has been rated as follows.

> **Degree of certainty:** Possible; **Significance:** MODERATE (LOW: Post Mitigation); **Direction:** negative; **Time-scale:** sporadic/intermittent and **Spatial scale:** *local.*

The same mitigation measures discussed under "construction" should be applied. This should decrease the significance to LOW (see brackets above).

Table 4: Summary Table of Individual and Family level Impacts: Construction Phase

Impact Variable	Certainty		Significance		Direction (+;-)		Time Scale		Spatial Scale	
	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.
Impacts on daily movement patterns	Definite	Probable	HIGH	MOD	-	-	Spo-radic	Spo-radic	Loc.	Loc.
Public health, safety & security impacts	Probable	Possible	HIGH	MOD.	-	-	Spo-radic	Spo-radic	Loc.	Loc.
Impacts on tourism and recreational activities	Probable	Probable	MOD.	LOW.	-	-	S.T.	S.T.	Loc.	Loc.
Disruption of Social Networks	Possible	Possible	HIGH	MOD.	-	-	Spo-radic	Spo-radic	Loc.	Loc.

Table 5: Summary Table of Individual and Family level Impacts: Operational Phase

Impact Variable	Certainty		Significance		Direction (+;-)		Time Scale		Spatial Scale	
	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.
Impacts on daily movement patterns	Probable	N/A	VERY LOW	N/A	-	-	Sporadic	Sporadic	Loc.	Loc.
Public health, safety & security impacts	Possible	N/A	VERY LOW	N/A	-	-	Sporadic	Sporadic	Loc.	Loc.
Impacts on tourism and recreational activities	Possible	N/A	VERY LOW	N/A	-	-	S.T.	S.T.	Loc.	Loc.
Disruption of Social Networks	Unlikely	N/A	VERY LOW	N/A	-	-	Sporadic	Sporadic	Loc.	Loc.

Table 6: Summary Table of Individual and Family level Impacts: Decommissioning Phase

Impact Variable	Certainty		Significance		Direction (+;-)		Time Scale		Spatial Scale	
	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.
Impacts on daily movement patterns	Probable	Probable	MOD.	LOW	-	-	S.T.	S.T.	Loc.	Loc.
Public health, safety & security impacts	Probable	Probable	MOD.	LOW	-	-	Sporadic	Sporadic	Loc.	Loc.
Impacts on tourism and recreational activities	Probable	Probable	MOD.	LOW.	-	-	S.T.	S.T.	Loc.	Loc.
Disruption of Social Networks	Possible	Possible	MOD.	LOW	-	-	Sporadic	Sporadic	Loc.	Loc.

3.3 SOCIO-ECONOMIC IMPACTS: JOB CREATION; SMMES' AND BUSINESS

Context:

- **This variable seeks to assess:** Any socio-economic impacts attributed to the AW, including: (1) job creation, impacts on local business; SMME development; and (2) enhanced economic inequities.
- **Thumbnail sketch of baseline conditions:**
  - **Employment figures:**
    - 39.5% of the population in the Mooi Mpofana Municipality is employed, whilst 31.3% is unemployed and 29% is economically not active. According to the 2001 Census Data, South Africa's employment rate is estimated at 34% and unemployment rate at 24%. 42% were not economically active.
    - 44% of the population between the ages of 15-65 years in the Umngeni Municipality is employed, whilst 23% is unemployed and 32% is not economically active (2001 Census data).
    - Provincial unemployment level : 26.2% (Stats SA, September, 2004)
  - **Skills shortage in KZN:** Has been described as 'severe' (KZN Premier Ndebele, January 2006).
  - **Schooling:**
    - 15% of the population in the Umngeni Municipality have no schooling
    - 21.5% of the population in the Umngeni Muncipality have completed Grade 12
    - 26% of the population in the Mooi Mpofana Municipality have no schooling
    - 14.6% of the population in the Mooi Mpofana Municipality have completed Grade 12.

i. **Construction Phase**

(a) Nature and extent of change processes and impacts

The total construction costs for the AW will be in excess of R 91 million[30]. Based on an assessment of the costing and engineer economics data, the construction (change) process should yield a number of job opportunities (impacts) for local individuals and SMMEs. Such opportunities would range from route clearing and grubbing; landscaping; and excavation/backfilling of trenches; to fencing and brickwork. Some of the job opportunities (e.g. route clearing and backfilling of trenches) would benefit those who are unskilled. Some mismatches between available skills (the average age of an artisan in South Africa today is 55 years of age[31]), are expected in the case of brickwork as well as more specialized work such as the installation and commissioning of pumps at the Spring Grove pump-station.

The positive impact on local business is expected to range from building material procurement and plant hire to accommodation provided to DWAF officials and engineering consultants involved in the project. An amount of R 500 000 has been allocated for the accommodation of the contractor's staff.

Both the formal and informal business sector is anticipated to benefit from the presence of contractors. Positive impacts on the informal business sector would include purchases by contract workers from local hawkers (illegal sale of liquor to construction workers to be prevented). Mobility of the hawkers, and therefore access to the target market, would serve as their most important strategic advantage. The formal business sector would benefit from purchases at local chain-stores; smaller shops; garages; and fuel depots (consumables such as diesel and lubricants).

Whilst the above impacts would be positive, they are not substantial in relation to other impacts and, very importantly, not sustainable. To put these statement into perspective and to motivate the impact rating, it is important to note that the June/July (2006) school holiday tourism period alone was expected to yield a direct

[30] Goba Moahloli Keeve Steyn (January, 2004).

[31] Ndebele, 2006.

economic impact (KZN province) of approximately R2 bn[32]. The Midlands Meander and Howick rate as the most popular places visited[33] by the domestic and to a lesser extent, foreign tourists.

In view of the above, the job creation and local business related impacts have been rated as follows:

Degree of certainty: Probable; **Significance:** MODERATE; **Direction:** positive; **Time-scale:** short-term; and **Spatial scale:** *local.*

(b) Maximizing positive impacts

By way of maximizing the positive impacts described above, it is recommended that the project proponent (DWAF) make it incumbent (as a tender requirement) on the contractors to:

- appoint locals where practicable and feasible in terms of the requirements of the AW construction process;
- source building material; food for workers in construction camps; and consumables (fuel; lubricants, etc.) from local businesses (both formal and informal).

ii. Operational Phase

In terms of the operational phase of the AW, the rating for the variable, *'socio-economic impacts',* has been adjusted as follows.

Degree of certainty: Unlikely; **Significance:** VERY LOW; **Direction:** positive; **Time-scale:** permanent and **Spatial scale:** *local.*

The main motivation for this rating is that maintenance to be undertaken is not expected to bring about discernable socio-economic benefits that cannot be more easily and sustainably accrued from other sources (e.g. tourism).

[32] Tourism Kwa-Zulu Natal, June 2006.

[33] Zulu Kingdom (undated). www.kzn.org.za.

iii. Decommissioning Phase

Decommissioning of the AW (should this be required in the future) will be similar to the construction process in that a contractor(s) and work-force would have to be deployed. Short-term job creation and associated increased demand for local goods and services (e.g. food; accommodation; consumables such as petrol and lubricants for machinery) is therefore probable. However, unlike during the construction process, decommissioning probably won't benefit local builders' merchants. Compared to the socio-economic benefits to be derived from the AW decommissioning phase, tourism would yield benefits more readily and sustainably. The variable relating to *'socio-economic impacts'* has therefore been rated as follows.

Degree of certainty: Probable; **Significance:** LOW; **Direction:** positive; **Time-scale:** short-term and **Spatial scale:** *local.*

Table 7: Summary Table of Socio-economic impacts: Construction Phase

Impact Variable	Certainty		Significance		Direction (+;-)		Time Scale		Spatial Scale	
	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.
Socio-econ. Impacts	Probable	N/A	MOD.	N/A	+	N/A	Short-term	N/A	Local	N/A

Table 8: Summary Table of Socio-economic impacts: Operational Phase

Impact Variable	Certainty		Significance		Direction (+;-)		Time Scale		Spatial Scale	
	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.
Socio-economic impacts.	Unlikely	N/A	VERY LOW	N/A	+	N/A	Short-term	N/A	Local	N/A

Table 9: Summary Table of Socio-economic impacts: Decommissioning Phase

Impact Variable	Certainty		Significance		Direction (+;-)		Time Scale		Spatial Scale	
	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.
Socio-economic impacts	Probable	N/A	LOW	N/A	+	N/A	Short-term	N/A	Local	N/A

3.4 IMPACTS ON COMMUNITY INFRASTRUCTURE[34]

This variable guides the assessment of the change processes and impacts on community infrastructure along the proposed pipeline route.

i. Construction and Decommissioning Phase

(a) Nature and extent of change processes and impacts

Key change processes in terms of the construction of the transfer pipeline are: access to the servitude construction terrain via private properties and potential impacts on infrastructure and farming activities. The nature and extent of these impacts would differ depending on the area and land uses, which are diverse and range from farms to urban lifestyle estates such as Gowrie as well as planned future estate.

In cultivated areas, construction activities could exert a negative impact on farming activities (e.g. harvesting and irrigation; movement/access of tractors/trucks and livestock). Clearance of land to facilitate construction and increased use of local roads (maintenance) and/or the creation of additional access roads (erosion risk), as well as livestock loss due to gates being left open by workers, would have financial implications for farmers. Other impacts could be damage to irrigation lines, fences, essential services (water, electricity, sanitation) and illegal fishing on farms with trout dams. The following area considered key impact focal points:

- Rising main section from the proposed dam wall to the existing servitude situated along the Nottingham Village – Rosetta Road
- Gowrie Estate and planned golf estate
- Properties beyond Gowrie up to, and including the Mpofana outfall as well as the gauging weir.

In view of the above, infrastructure impacts have been rated as follows:

Degree of certainty: Probable; **Significance:** MODERATE; **Direction:** negative; **Time-scale:** short-term; and **Spatial scale:** *local.*

[34] Adapted from WRP Consulting Engineers (October, 2002).

(b) Mitigation Measures

The following mitigation measures are recommended:

- Access to private properties by arrangement with property owners;
- Audit of all infrastructure, e.g. pipelines; fencing; gates; overhead cables; other farming infrastructure, etc. with a view to avoiding impacts;
- Consultation with farmer about farming activity, including movement of farming equipment and livestock, with a view to avoiding impacts and disruptions;
- Closing of all gates after use.

(c) Post mitigation impacts

Bearing in mind that mitigation measures would apply only to the workforce:

Degree of certainty: Possible; **Significance:** LOW; **Direction:** negative; **Time-scale:** Intermittent/sporadic; and **Spatial scale:** *local.*

ii. Operational Phase

During the operational phase, infrastructure impacts are expected to be considerably lower and generally related to maintenance activities:

Degree of certainty: Possible; **Significance:** VERY LOW; **Direction:** negative; **Time-scale:** Intermittent/sporadic; and **Spatial scale:** *local.*

The main motivation for this rating is that maintenance to be undertaken will be sporadic/intermittent. The same mitigation measures proposed above should be applied.

Table 10: Summary Table of Infrastructure Impacts: Construction & Decommissioning Phase

Impact Variable	Certainty		Significance		Direction (+;-)		Time Scale		Spatial Scale	
	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.
Infrastructure impacts	Probable	Possible	MOD.	LOW	-	-	Short-term	N/A	Local	N/A

Table 11: Summary Table of Infrastructure Impacts: Operational Phase

Impact Variable	Certainty		Significance		Direction (+;-)		Time Scale		Spatial Scale	
	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.
Infrastructure impacts	Possible	N/A	VERY LOW	-	-	-	Long-term	Long-term	Local	N/A

3.5 COMMUNITY/INSTITUTIONAL ARRANGEMENTS' RELATED CHANGE PROCESSES / IMPACTS: PUBLIC INVOLVEMENT

3.5.1 Attitude formation

This variable seeks to assess changes relating to attitude formation that can be attributed to the AW specifically. As discussed earlier, attitudes and interest group activity would not constitute impacts per se. It would rather be associated with an appraisal by I&APs of the proposed project, change events and perceived impacts. If such appraisal about the objects of thought (being the project; changes processes or impacts), includes *evaluative judgments* - positive, negative or neutral, these are by definition[35], attitudes (in short, how we feel about things). This definition was applied for purposes of a thorough content analysis of the comments received from I&APs (2002/2007) pertaining to the Spring Grove dam in general and the AW specifically, suggests the following. Based on this analysis, the following evident:

(a) The overwhelming majority of I&APs registered for the project or requested *further information*, including maps and specific property impacts (including inundation);

(b) Generally, I&APs raised *issues* (here defined as matters they believed would require attention/study during the SIA/EIA or feedback through public participation process; or *concerns* (here defined as matters they perceived as problematic and requiring attention/study as part of the SIA/EIA or feedback through public participation process. (Refer to the SIA report on the proposed Spring Grove Dam for further evaluative judgments).

Attitudes or evaluative judgments (positive and negative) (AW only) were limited to select I&APs and sometimes accompanied:

- By provisos (in the case of positive attitudes);
- By suggestions regarding alternatives for the project and/or mitigation measures (in the case of negative attitudes);

None of the I&APs reported being neutral about the Spring Grove Dam / AW. Their omission to express attitudes cannot be taken to indicate neutral, positive or negative feelings.

[35] Kimble, C.E. (1990).

3.5.2 Interest Group Activity

Again, interest group activity is not a social impact. If formed in direct response to the proposed project as a community articulation and mobilization tool, it can be seen as a proxy for opposition against the project.

This definition was applied for purposes of a thorough content analysis of the comments received from I&APs (2002[36]/2007) pertaining to the Spring Grove dam in general and the AW specifically, suggests the following. Based on this analysis, the following evident:

(a) No interest groups have been formed specifically in response to the project;

(b) No expression of intent to form interest groups in the future and/or to mobilize against the project.

3.6 INTRUSION IMPACTS

This variable seeks to assess visual; dust; malodour and noise impacts (collectively defined as intrusion impacts).

3.6.1 Dust / Air pollution Impacts

i. Construction Phase

(a) Nature and extent of change processes and impacts

The main change processes with a bearing on this variable are:

- construction activity *on-site*, including the pump-station; break pressure tank; Mpofana outfall structures and river flow gauging weirs (situated immediately downstream of the transfer outfall works at the Mpofana river; and on the Mooi River immediately downstream from the proposed Spring Grove Dam) .
- construction activity, including excavation, laying pipes and backfilling along the new rising main servitude and existing Mearns servitude to, and beyond the break pressure tank at Gowrie.
- construction vehicle movement along dirt roads.

[36] Public participation reports.

The impact resulting from this change process would be dust/air pollution (including diesel fumes), affecting:

- individuals/families residing and/or working on the properties earmarked for the AW related infrastructure described above;
- individuals/families residing next to haul roads as well as pedestrians and motorists using haul roads.

Proximity to the sources of dust/air pollution and land uses, inter alia, would result in the impacts manifesting differentially from locality to locality. In view of the above, this variable has been rated as follow:

Degree of certainty: Probable; **Significance:** MODERATE; **Direction:** negative; **Time-scale:** short-term; and **Spatial scale:** *local.*

(b) Mitigation Measures

In the case of the variable 'dust impacts', mitigation is anticipated to be entirely achievable. The following mitigation measures are proposed:

- regular spraying of construction sites and dirt roads with water as a dust suppression measures;
- proper maintenance of all construction equipment in order to limited air pollution;
- adherence to traffic rules, notably the speed limit / no reckless driving to minimize dust.

(c) Post mitigation impacts

Following successful introduction of mitigation measures, the rating of the variable can be adjusted as follows:

Degree of certainty: Possible; **Significance:** LOW; **Direction:** negative; **Time-scale:** sporadic/intermittent; and **Spatial scale:** *local.*

ii. **Operational Phase**

During the operational phase of the AW, dust/air pollution impacts will be negligible and emanating from change processes associated with maintenance activity. The following rating accrues:

> **Degree of certainty:** Unlikely; **Significance:** VERY LOW; **Direction:** negative; **Time-scale:** intermittent/sporadic and **Spatial scale:** *local.*

iii. **Decommissioning Phase**

A reasonable level of worker activity is expected to be necessary to decommission the AW (should this be required in the future). The activity (change process), however, is not expected to be on-par with that of the construction phase. Consequently, the variable *'dust/air pollution impacts',* has been rated as follows.

> **Degree of certainty:** Probable; **Significance:** MODERATE (LOW: Post Mitigation); **Direction:** negative; **Time-scale:** sporadic/intermittent and **Spatial scale:** *local.*

The same mitigation measures discussed under "construction" should be applied. This should decrease the significance to LOW (see brackets above).

3.6.2 Noise and vibration Impacts

i. **Construction Phase**

(a) Nature and extent of change processes and impacts

The main change processes with a bearing on this variable are construction activity (including excavation[37] and backfilling; building/construction; construction vehicles / equipment); and construction camp activity (e.g. vehicle and equipment maintenance; construction workers engaging in recreational activities). These change processes are expected to generate noise/vibration, which if perceived as intrusive (and possible resulting in anger and frustration), can be considered social impacts. Proximity to the noise and vibration sources; when they occur as well as the characteristics of the various receiving environments (e.g. built-up; topography; presence of trees; inhabited/uninhabited); are expected to play an important role as

[37] Could include sporadic blasting, depending on the geo-technical features, .e.g. rock outcrops.

to the manifestation of impacts. Properties along the proposed new rising main servitude; the existing servitude at, and beyond, Gowrie (including the "Choice Chix" Chicken Farm); the main construction site (Spring Grove dam) and along haul routes (including the road to the proposed quarry site), are expected to be most affected. This variable has therefore been rated as follow:

Degree of certainty: Probable; **Significance:** MODERATE; **Direction:** negative; **Time-scale:** short-term; and **Spatial scale:** *local.*

(b) Mitigation Measures

The mitigation measures below are expected to attenuate the noise and vibration impacts:

- limiting noise/vibration producing activities to business hours, i.e. no construction activity after-hours / weekends or limitation thereof to activities that are not intrusive;
- ensuring that all construction machinery is well maintained and equipped with silencers;
- compliance with traffic regulations – speed limit and orderly conduct;
- encouraging construction workers that live in construction camps to conduct themselves in a temperate fashion, i.e. no loud music;

(c) Post mitigation impacts

Following successful introduction of mitigation measures, the rating of the variable can be adjusted as follows:

Degree of certainty: Possible; **Significance:** LOW; **Direction:** negative; **Time-scale:** short-term; and **Spatial scale:** *local.*

ii. **Operational Phase**

During the operational phase, noise and vibration impacts are expected to be limited to maintenance activity; the operation of the outfall structure on the Mpofana river; river flow gauging weirs and the pump-station at the proposed Spring Grove dam site (all covered in SIA on the proposed SGD). Also bearing in mind the very low population densities at the dam site and the presence of natural sounds (rivers), this

variable has been rated as follows:

> **Degree of certainty:** Possible; **Significance:** VERY LOW; **Direction:** negative; **Time-scale:** sporadic/intermittent and **Spatial scale:** *local.*

iii. **Decommissioning Phase**

A reasonable level of worker activity is expected to be necessary to decommission the AW (should this be required in the future). The activity (change process), however, is not expected to be on-par with that of the construction phase. Consequently, the variable *'noise/vibration impacts',* has been rated as follows.

> **Degree of certainty:** Probable; **Significance:** LOW (VERY LOW: Post Mitigation); **Direction:** negative; **Time-scale:** short-term and **Spatial scale:** *local.*

The same mitigation measures discussed under "construction" should be applied. This should decrease the significance to LOW (see brackets above).

3.6.3 Visual/Aesthetic Impacts

i. **Construction Phase**

(b) Nature and extent of change processes and impacts

The main change processes with a bearing on this variable are:

- construction activity, including excavation, laying pipes and backfilling along the new rising main servitude and existing Mearns servitude to, and beyond the break pressure tank at Gowrie.
- the structures that will arises based on the construction activity, being the pipelines (buried with the exception of inspection points); break pressure tank; pump-station at the dam; river flow measuring weirs (situated immediately downstream of the transfer outfall works at the Mpofana river; and on the Mooi River immediately downstream from the proposed Spring Grove Dam); and new outfall works at the Mpofana River.
- main and smaller construction camps at key locations, probably including the Spring Grove Dam site, along the pipeline servitudes; river gauging weir/Mpofana outfall and Gowrie. (Exact construction camp locations are yet to be confirmed). Such construction camps normally include some accommodation for workers; a site office(s); stores; building materials and construction (plant)

equipment; and lights (for security purposes).

Visual aesthetic perception or aesthetics can be defined as “the capacity to visually perceive a particular attribute added to other features of objects, such as form, colour or movement” (Cela-Conde, 2004, p.6321). In the case of AW, attributes other than the features of the construction equipment/activity would therefore have to be perceived to qualify as ‘visual aesthetic perception’. More important is whether the construction related change processes would qualify as aesthetics and sense of place related impacts. Important guidance come from research on the psychological experience of sense of place, which shows *people rapidly discount a landscape as soon as the first scar occurs, rather like a stain ruining a favourite garment*. Thereafter, any additional impacts on the landscape have a correspondingly smaller effect[38]. Zadik (1985) further clarifies that *"people seem to respond to environments as natural if the areas are predominantly vegetation and do not contain human artefacts such as roads or buildings*."

Bearing the above in mind, it can be stated that all areas which are to feature construction activity, equipment and camps, have been developed even though their characteristics and scale differs. Whilst the novelty of the construction process / equipment and its dissimilarity from a built-up area such as Gowrie is expected to drawn attention and even evoke feelings of being visually intrusive, these construction-related change processes are:

- short-term; and
- expected to have a smaller effect compared to what would have been the case in a pristine environment.

This variable has therefore been rated as follow:

Degree of certainty: Probable; **Significance:** MODERATE; **Direction:** negative; **Time-scale:** short-term; and **Spatial scale:** *local.*

[38] Petrich (1993), p. 249-267. Cited by Bron, 2006.

(d) Mitigation Measures

In terms of visual/aesthetic impacts, mitigation is anticipated to be achievable. The following mitigation measures are proposed:

- location of construction camps; vehicles; fuel and toilet/washing facilities for workers away from residential areas;
- swift excavation and backfilling of trenches, particularly in built-up areas, e.g. Gowrie which are traversed by a servitude located in very close proximity to residential, business and recreational properties;
- restoration of areas to their former state, including planting of grass on existing and new servitudes to foster blending-in with the surrounding environment;
- painting of inspection points on pipelines in a colour that will ensure parity with the environment;
- construction of all super-structures (outfall structure at the Mpofana River; river flow measuring weirs; pump-station at the dam) in a manner that will minimize visual impacts. This could include shielding of structures behind trees; limiting the height of the structures; using paints and paint techniques to facilitate blending-in with the environment.

(e) Post mitigation impacts

Following successful introduction of mitigation measures, the rating of the variable can be adjusted as follows:

> **Degree of certainty:** Possible; **Significance:** LOW; **Direction:** negative; **Time-scale:** short-term; and **Spatial scale:** *local.*

ii. **Operational Phase**

Based on the research cited under the 'construction' section above, it can be stated that all areas in which the AW infrastructure is to be installed already show signs of development. For example, Gowrie already has a break pressure tank; a number of pump-stations exist at the proposed dam site; a wide servitude exists (Mearns); and an outfall structure exists at the Mpofana river. The characteristics of these areas range from urban settlements (e.g. Gowrie; Nottingham Road; Rosetta) to farms and tourist lodges. This includes the areas where the river flow gauging weirs are to be

constructed, although the area downstream from the proposed Spring Grove Dam wall (site of one of the river flow gauging weirs) is more 'cluttered' than the proposed location of the second weir (beyond the existing Mpofana outfall structure). Bearing these differences in mind, the proposed AW infrastructure and super-structure is expected to have a smaller effect compared to what would have been the case in pristine localities. This variable has therefore been rated as follow:

Degree of certainty: Possible; **Significance:** LOW; **Direction:** negative; **Time-scale:** long-term and **Spatial scale:** *local.*

iii. **Decommissioning Phase**

A reasonable level of worker activity is expected to be necessary to decommission the AW (should this be required in the future). The activity (change process), however, is not expected to be on-par with that of the construction phase. Consequently, the variable *'visual/aesthetic impacts',* has been rated as follows.

Degree of certainty: Probable (possible, post mitigation); **Significance:** LOW (VERY LOW: Post Mitigation); **Direction:** negative; **Time-scale:** short-term and **Spatial scale:** *local.*

The same mitigation measures discussed under "construction" should be applied. This should decrease the significance to VERY LOW (see brackets above).

Table 122: Summary Table of Intrusion Impacts: Construction Phase

Impact Variable	Certainty		Significance		Direction (+;-)		Time Scale		Spatial Scale	
	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.
Dust/air pollution impacts	Probable	Possible	MOD.	LOW	-	-	Short-term	Sporadic	Loc.	Loc.
Noise impacts	Probable	Possible	MOD.	LOW	-	-	Short-term	Short-term	Loc.	Loc.
Visual/ aesthetic impacts	Probable	Possible	MOD.	LOW	-	-	Short-term	Short-term	Loc.	Loc.

Table 133: Summary Table of Intrusion Impacts: Operational Phase

Impact Variable	Certainty		Significance		Direction (+;-)		Time Scale		Spatial Scale	
	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.
Dust/air pollution impacts	Unlikely	N/A	VERY LOW	N/A	-	-	Sporadic	Sporadic	Loc.	Loc.
Noise impacts	Possible	N/A	VERY LOW	N/A	-	-	Sporadic	Sporadic	Loc.	Loc.
Visual/ aesthetic impacts	Probable	Probable	HIGH	MOD	-	-	Long-term	Long-term	Loc.	Loc.

Table 144: Summary Table of Intrusion Impacts: Decommissioning Phase

Impact Variable	Certainty		Significance		Direction (+;-)		Time Scale		Spatial Scale	
	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.	Pre-Mt.	Post-Mt.
Dust/air pollution impacts	Probable	Possible	MOD.	LOW	-	-	Sporadic	N/A	Local	N/A
Noise impacts	Probable	N/A	LOW	N/A	-	-	Short-term	Short-term	Loc.	Loc.
Visual/ easthetic impacts	Probable	Possible	LOW	VERY LOW	-	-	Short-term	Short-term	Loc.	Loc.

4. SUMMARY AND CONCLUSIONS

4.1 CONSTRUCTION PHASE

Population change/impacts (inflow of workers): Even if it is the intent of the DWAF appointed contractors to source construction workers locally, it is unlikely to discourage people from elsewhere entering the area. It is this perceived prospect of employment opportunities, fuelled by potential rumours about the number of jobs to be created (and opportunities for crime) that would attract outsiders. Furthermore, introducing job opportunities into a resource-starved environment is a potential source of competition between unemployed locals - a situation that would be exacerbated by outsiders, potentially resulting in conflict – the felt impact of the change process. Also keeping in mind planned new developments some of which appear to be emerging on the back of the proposed Spring Grove Dam in general and tourism prospects in particular (cumulative impacts), this variable has been rated high in significance (negative), probable, short-term and responsive to mitigation. The latter relates to impacts, the mitigation of which falls in the purview of the DWAF contractor. In terms of changes in the **age, gender, racial or ethnic composition of the population,** an inflow of people from other countries in search of employment, rather than locals from surrounding communities and rural areas would be the main change process under this variable. If locals perceive this inflow as adverse and destabilizing (also in terms of social capital), or if conflict with newcomers ensues, this change would qualify as an impact. Whilst the exact figures and consequent changes in the composition of the population cannot be determined, even with further research, the variable has been rated as probable and high in significance (negative). **Relocation related** impacts were rated as probable and high in significance (negative) in response to the expected relocation of a farm-worker accommodation area on the alignment of the rising main pipeline. This impact is expected to be responsive to mitigation, including compensation and resettlement. Avoidance through re-routing of the pipeline on the servitude is preferred and would render the impact nil.

At the level of individuals and families, chance processes and impacts pertaining to daily movement patters; public health, safety and security; tourism/recreation and social networks, were considered. Impacts on **daily movement patterns** were rated as definite and high in significance (but responsive to mitigation), given the expected impacts along the very busy and narrow R103 and steep/narrow D146 (toward the R103). The potential for cumulative impacts exists if current (Gowrie) and mooted development projects (Rowdans) happen concurrently.

Public health, safety and security related impacts commensurate with construction activity and worker presence were rated as probable and high in significance (negative), but responsive to mitigation. The potential for cumulative safety and health impacts exists if current (Gowrie) and mooted development projects (e.g. Rowdans) happen concurrently. Impacts on **tourism and recreational activities** were rated as probable and moderate in significance (negative) to account for the anticipated alteration in the manner in which individuals *perceive* their recreational activities (e.g. loss of privacy), and/or through felt, physical impacts, e.g. constrained access and intrusive impacts (dust; noise). Post-mitigation, the impact is expected to be moderate in significance. Interference in **local social networks** would depend on a number of factors, including whether newcomers are foreigners or S.A. nationals from elsewhere and will be in the area only to secure employment at the AW project and leave if they are unsuccessful. In spite of these uncertainties, but given the importance of social capital for community safety and stability, the impact was rated as possible and high in significance (negative). Mitigation is anticipated to be difficult, but probably more achievable in terms of a stable workforce already employed by, or yet to be employed by the contractor(s) to be appointed by DWAF. Following successful mitigation, the impact significance can be adjusted to moderate.

Socio-economic impacts were rated as probable to account for job creation and positive impacts on local business. The impacts were rated as moderate, given that the impact cannot be sustained beyond the construction phase. Change processes and impacts relating to **infrastructure on properties** traversed by the AW were rated as probable and moderate in significance (possible; low; following successful mitigation).

Attitude formation and interested group activity were used as markers to analyze public sentiments toward the AW. No evidence was found based on an analysis of the public participation and consultation record of negative attitudes, interest group activity, or social mobilization (either current or mooted) toward the AW in particular. **Intrusion impacts** (dust/air pollution; noise/vibration and visual/aesthetic impacts) were rated as probable (possible: post-mitigation), moderate in significance and short-term (sporadic: post-mitigation (dust)).

4.2 OPERATIONAL PHASE

Population change/impacts: In terms of the operational phase of the AW, the variable *'inflow of job seekers'* has been rated as possible, but the significance as very low, given limited job prospects (maintenance). In terms of the operational phase of the AW, the

impacts resulting from **changes in the age, gender, racial or ethnic composition of the population** were rated as unlikely and very low in significance. **Movement related impacts** (expected to be limited to maintenance) during operation, were rated as probable but very low in significance. **Health, safety and security impacts** during the operational phase were rated as possible but very low in significance. Impacts on **tourism and recreational activities** (associated with maintenance) were rated as possible but very low in significance. During operation, impacts on **social networks** would be unlikely and very low in significance. During the operational phase of the AW, **socio-economic impacts** are unlikely and very low in significance. Change processes and impacts relating to **infrastructure on properties** traversed by the AW were rated as possible; and very low in significance

Dust/air pollution impacts will be negligible and emanating from change processes associated with maintenance activity. **Noise and vibration** impacts (possible; very low in significance) are expected to be limited to maintenance activity and operation of the appurtenant works (see SIA of the Spring Grove Dam). All areas in which the AW infrastructure will be installed already show signs of development. For example, Gowrie already has a break pressure tank. Consequently, the proposed AW infrastructure and super-structure is expected to have a smaller effect in terms of **visual/aesthetic impacts** compared to what would have been the case in pristine localities, calling for a low significance rating.

4.3 DECOMMISSIONING PHASE

Population change/impacts: Since decommissioning of the AW is not expected to attract newcomers into the area at a level similar to the construction process, given limited employment prospects, a low significance rating has been allotted. Decommissioning of the AW is not expected to attract newcomers into the area at a level equal to the construction process. Impacts resulting from **changes in the age, gender, racial or ethnic composition of the population** were rated as possible, but low in significance. Decommissioning of the AW will probably impact **daily movement patterns** in a manner similar to those anticipated during construction process, justifying a rating of moderate (short-term; negative). Decommissioning of the AW will probably impact **daily movement patterns** in a manner similar to those anticipated during construction process, justifying a significance rating of moderate (short-term; negative). Impacts on **tourism/recreational activities** commensurate with decommissioning of the AW were rated as probable and moderate in significance (low: post mitigation). Whilst construction activity would manifest, impacts on

social networks are expected to be possible but of moderate significance (low: post mitigation). During the decommissioning phase, **short-term job creation and associated increased demand for local goods and services** (e.g. food; accommodation; consumables) is probable. The significance of this impact is considered low, given the lack of sustainability and that sectors such as tourism would yield benefits more sustainable and easy benefits. A reasonable level of worker activity is expected to be necessary to decommission the AW (should this be required in the future).

Dust/air pollution impacts were rated as probable and moderate in significance (low: post-mitigation). **Visual/aesthetic impacts** were rated as probable (possible: post mitigation) and of low significance to account for the change processes and resultant impacts of worker and construction activities/equipment.

5. RECOMMENDATIONS

It was noted at the outset that in assessing social impacts, a distinction must be drawn between the proposed project (being the AW) and unrelated current / future changes in the physical and/or social environment. The social impacts would be the difference between the project changes and unrelated changes. In view of this and the results of the assessment, it be stated that the proposed AW will probably not bring about change processes and impacts much more *significant and remarkable* than could be attributed, over time, to unrelated ones (e.g. current development; tourism and socio-economic impacts). This is particularly true for the operational phase. The construction phase has to be approached with caution in the sphere of population (inflow of people); movement, health, safety/security and intrusion impacts (notably R103/D146/Kamberg Rd.), particularly if these are added to current and foreseeable future impacts. Bearing in mind notably those change processes resulting in significant impacts with consequences that require careful consideration and mitigation, it is recommended that:

(a) All mitigation measures be carefully considered and implemented.
(b) A Mitigation Monitoring Committee (MMC) comprising affected parties, the project proponent; Environmental Monitoring/Control Officer (EMO); Local Government and the DWAF contractor, should be formally established. This committee should monitor the implementation and impact mitigation process, using the EMP as basis.

6. REFERENCES

Bekker, R. (1999). *Social Impact Assessment*. Netherlands.

Boba, R. & Santos, R. 2006. *Burglary at Single-Family House Construction Sites.* U.S. Department of Justice, Office of Community Oriented Policing Services.

Branch, Hooper, Thompson & Creighton (1984). *Guide to Social Assessment. A framework for assessing social change.* Colorado: Westview Press.

Brugge, K.U. (2007). *Minutes of Focus Groups and interviews held with I&APs.* Johannesburg.

Brugge, K.U. & Snyman, I. (2007). *SIA baseline analysis.* Johannesburg.

Burdge, R.J. (1995). *A community guide to social impact assessment.* Middleton: Social Ecology Press.

Carver, C.S., Scheier, M.F., & Weintraub, J.K. (1989). *Journal of Personality and Social Psychology*, 56, *2*, pp.267-283.

Cela-Conde et al. (2004). Activation of the prefrontal cortex in the human visual perception. *PNAS*, 101, *16: 6321-6325.*

Conningarth Economists (October, 2007). *Issues in relation to the appropriateness of the Mooi-Mgeni Transfer Scheme Phase-2 in the Mgeni Water Supply Master Plan. Draft Report.*

Cymbian (2007). *Minutes of public participation meetings and comments sheets received from Interested and Affected Parties.*

EIA Regulations (April, 1998). *Implementation of sections 21 22 and 26 of the Environment Conservation Act.*

Harris, B. (2002). Xenophobia: A new pathology in South Africa? In Hook, D. & Eagle, G. (eds) *Psychopathology and Social Prejudice,* pp. 169-184, Cape Town: University of Cape Town Press, 2002.

Goba Moahloli Keeve Steyn (January, 2004). *Mooi-Mgeni River Transfer Scheme: Phase 2: Feasibility Study, Supporting Report 6: Costing and Engineering Economics.*

IAIA (2003). Social Impact Assessment. International Principles. *Special Publication Series*, 5: pp.1-8.

Kimble, C.E. (1990). *Social Psychology. Studying Human Interaction.* WCB Publishers.

KZN Department of Transport (2004). *White Paper on Freight Transport Policy.*

Mpofana Municipality (February, 2006). *Draft Integrated Development Plan (IDP) review: 2006/2007.*

National Environmental Management Act., Act 107 of 1998.

Ndebele, S. (January, 2006). S*peech by Pemier of Kwazulu-Natal Mr. Sibusiso Ndebele on the occasion to mark the release of Matric results of 2006.*

Palmary, I. (September, 2004.) *Traditional Leaders in the eThekwini Metropolitan Region: Their role in crime prevention and safety promotion.* Centre for the Study of Violence and Reconciliation and Midlands Women's Group.

SAPS (2007). *Crime stats. for Mooi River; Nottingham Road and Rietvlei.*

Schussler, M. (2006). *The 4th South African Employment Report: Working and Spending in South Africa and the effect of Porous Borders.* T-Sec Economists.

Solomon, H. (1996). Strategic perspectives on illegal immigration into South Africa. *African Security Review*, 5: 4.

Stats SA (September, 2004). *KZN Stats News.*

Sunday Times (22 April 2007). *Mapping SA's Crime Hotspost.*

The Interorganizational Committee on Guidelines and Principles for Social Impact Assessment (May, 1994). *Guidelines and Principles for Social Impact Assessment.* International Organisation for Impact Assessment. Available on-line at www.iaia.org.

Tourism Kwa-Zulu Natal (June 2006). Preliminary Estimates of Tourism Flow Figures to KwaZulu-Natal over the 2006 June/July School Holiday Period. *Occasional Paper No. 44.*

University of Kwa-Zulu/Natal. (2007). *HEARD.* Available on-line at: www.ukzn.ac.za/heard/

Vanclay, F. (2002). Conceptualizing Social Impacts. *Environmental Impact Assessment Review,* 22: 183– 211.

Venn Nemeth & Hart Inc. (26/1/2006). *Gowrie Farm Golf and Fly Fishing Estate, Agreement of Sale.*

Woolcock, Michael (1998). Social capital and economic development: toward a theoretical synthesis and policy framework." *Theory and Society.* 27(2): 151-208.

WRP Consulting Engineers (October, 2002). *Mooi-Mgeni Transfer Scheme Phase 2. Environmental Impact Assessment. Supporting Report 8: Social Impact Assessment.* Hilton: WRP.

Zadik, M.H. (1985). Social perspectives in horticulture. *Proceedings of the Longwood graduate*

program seminars 17:36-41. Longwood Gardens, PA.

Zulu Kingdom (undated). www.kzn.org.za.