



## 6. Drought crisis management, challenges and solutions: Southern Cape, George

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### 1. INTRODUCTION AND BACKGROUND

After a dry and hot 2008/2009 peak holiday season, and no rain relief, the Garden Route Dam (GRD) had dropped to a level of 60%. In April 2009 the George Municipality introduced water restrictions. The Garden Route Dam is fed by the Swart River, with a registered water use of 30 ML/day, and by a pumping scheme on the Kaaimans River, with a registered water use of 7,3ML/day that discharges into the Garden Route Dam. The Garden Route Dam is the only source of water for the town of George, that includes Herolds Bay and Victoria Bay, and in peak times supplements the water supply to Wilderness that has the Touw River as its main source of raw water.

After the initial water restrictions were implemented, the average daily consumption was down to approximately 33 ML/day from the December 2008/January 2009 peak usage of 35 to 36 ML/day. The restrictions thus had little impact on water consumption, and water restrictions were again intensified in June 2009 when the GRD dropped to a level of 45%. Consumption remained too high, rainfall was minimal, and the raw water source was under increasing stress.

The level of the GRD had dropped to 33% when the first disaster meeting, initiated by Eden and Provincial Disaster Management, was held on 26 August 2009, with representatives from the affected municipalities, Eden and Provincial Disaster Management, Dept: Water Affairs, Provincial and National Treasury and the Dept: Agriculture. The purpose of the meeting was to assess the situation and decide on the way forward. Since the initial meeting, and to date, monthly meetings have been held with representation from all role players. After a closer assessment of local conditions, it was determined that without intervention, and if the unfavourable rainfall predictions were realised, George's raw water supply would be depleted by February 2010.

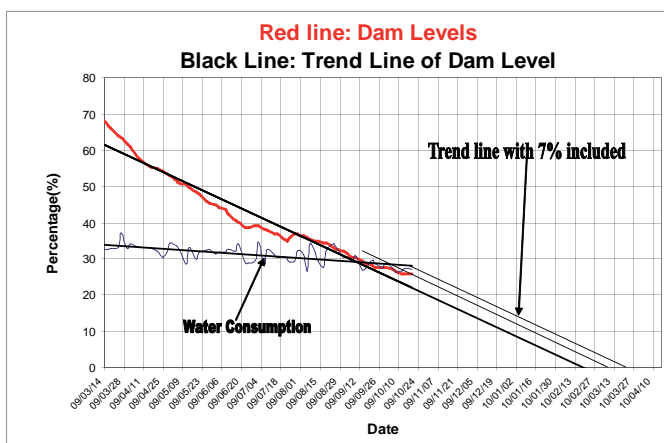


Figure 1: Garden Route Dam: Trend Lines of Dam Level

#### 1.1 Garden Route Dam trend (including and excluding 7% dead volume)

A communication was sent out to the Executive Mayors in the drought

stricken areas by Minister Anton Bredell, the MEC for Local Government, on 23 September 2009, requesting the following immediate action:

- Implement emergency tariffs (legal and procedural prescripts apply)
- Install low-flow or low-pressure water systems
- Monitor consumers with high water consumption and take appropriate steps to limit their water use
- Commit financial and human resources to Joint District Communications Team (district-wide public awareness campaign)
- Reprioritize operational budget - law enforcement, public awareness, flow control
- Reprioritize capital budget - implement short- & medium-term solutions
- Commit human and financial resources needed to address the crisis



Figure 2 : Garden Route Dam – Full



Figure 3 : Garden Route Dam – 26%

On receiving Minister Bredell's request for immediate action, the following were initiated:

- On 2 October 2009 a request was submitted for a Special Council Meeting to fully inform politicians and get political support
- A service provider appointed to launch an intensive public awareness drive
- An engineering technician appointed to monitor water consumption, to identify high consumers, to implement remedial actions where required etc
- The Eden Awareness Campaign - a co-ordinated drought awareness program
- Municipal department heads fully informed and requested to reprioritize capital and operational budgets (needed political approval)
- Application made to National Treasury to implement emergency water tariffs
- Applications made for financial assistance with respect to disaster funding

- Items submitted to Council
  - Full drought report to inform Council of the situation
  - Report on options required to augment resources and cost implications thereof
  - Request to declare George a disaster area
  - Implementation of emergency tariffs
  - Installation of flow reducing devices
  - Targets set to reduce consumption – household use limited to 15kl/month

## 2. BULK WATER RESOURCE PLANNING

The George Municipality's (9,03 Mm<sup>3</sup>) Garden Route Dam (GRD) and the (0,73 Mm<sup>3</sup>) Swart River Dam (SRD), provide an assured yield 13,4 Mm<sup>3</sup> per annum. The Kaaimans River Weir and Pump Station Scheme, that discharges directly into the GRD, was rehabilitated and reinstated in 2008, increasing the yield by 1,6 Mm<sup>3</sup> per annum, bringing the total yield of the GRD to 15,0 Mm<sup>3</sup>/a (1:50 year reliability). The Touw River provides Wilderness with approximately 1 Ml/day, and ground water is utilised by private entities.

Ninham Shand (Aurecon) was appointed by the George Municipality in 2005 to conduct a Bulk Water Planning Study to identify current and future bulk raw water resource needs within the George Municipal area until 2030, and to explore and compare the possible resources available for implementation.

A multi-disciplinary review and comparison of all the potential water augmentation schemes in the George region was required, and a Specialist Screening Workshop was held to workshop the possible water augmentation schemes. This workshop was attended by selected identified stakeholders and specialists, officials from the Dept: Water Affairs (DWA), Dept: Environmental Affairs and Development Planning (DEADP), members of the study team and the George Municipality, Mountain to Ocean (MTO) Forestry, Cape Nature, Wildlife and Environment Society of South Africa (WESSA), and various other parties. George Municipality commenced with the planning in 2008 for the raising of the GRD spillway, the Malgas Pumping Scheme, the Malgas Dam and the indirect re-use of treated effluent. At the time of the first disaster management meeting in August 2009, the Record of Decision (ROD) had been issued by the DEADP for the plant and infrastructure required for the indirect re-use of treated effluent and the associated pump station and pipeline. An application for a water use licence had been submitted to DWA the previous year for the Malgas Pumping Scheme. The George Municipality had also requested professional tenders for various projects on the 2009/2010 three year capital budget, and consultants had been appointed for all the relevant projects. Had George not had all the necessary plans in place, the outcome of this severe drought could have been an extreme disaster for the town of George.

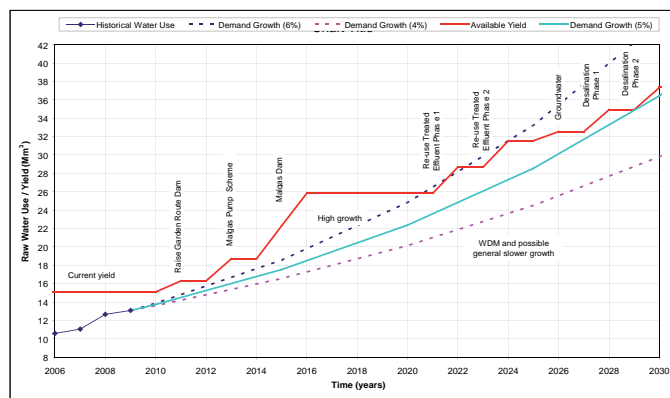


Figure 4: Options identified, in implementation order, as prioritized during screening of options workshop

## 3. DROUGHT MANAGEMENT PLANNING AND SOLUTIONS

Until the August 2009 disaster management meeting, the George Municipality had focussed on measures traditionally used to manage and reduce consumption in times of water stress i.e. water restrictions. Being an area with a historically secure and consistent rainfall pattern, no policy or guidance was available for managing a drought situation. The George municipal region experienced well below average rainfall in 2008, with consistently below average rainfall throughout 2009. The annual average for 2009 varied between 42% and 56% as measured at various rain metering stations.



Figure 5: Rainfall 2009 = 42 to 56% of Ann AVE

In order to manage the drought crisis, a systematic approach was required. The first approach was to identify all possible available resources, and the measures needed to utilise these resources, as well as all possible water management solutions. The following options were investigated for implementation:

1. Water Demand Management options
2. Water re-use - on site and bulk
3. Conventional resources and indirect re-use of effluent
4. Catchment management
5. Ground water
6. Public awareness
7. Monitoring of users and flow control devices
8. Additional measures

During the identification of emergency projects the following must be considered:

- Does the project address the immediate emergency need to mitigate the disaster situation;
- The project must be implemented in time to prevent economic and social collapse;
- The project must be sustainable in the long term;
- A project must be in accordance with long term planning for augmentation of raw water resources to sustain growth and development

### 3.1 The George Municipality has an existing water demand management policy that addresses the following:

Water Master Plan - updated quarterly

- Block tariffs
- Pipe replacement and maintenance program
- Complaints system and standby teams for immediate repair of burst pipes
- Pressure management
- Promoting use of water efficient fittings
- Public awareness



- Zone metering
- Telemetry system
- Installation of bulk meters in existing areas for monitoring
- Accurate records of water use & losses
- Promote rain water harvesting and indigenous gardens
- Water restrictions
- Strict municipal services standards for installing new water reticulation for own & private developments
- Reticulation material & quality standards - facilitates maintenance
- Up to date Water Services Development Plan (WSDP)
- All large development applications to be supported with evidence of Water Demand Management (WDM) interventions
- All new medium & large developments:
- Detailed WDM Plan; Pressure Management; Metering; Residential Measures - Water efficient fittings; 5 000 l rainwater tank per dwelling; Leakage Control; User Education; Indigenous Gardens

**Water re-use on site**

Residents were encouraged through a public awareness program to re-use grey water on site - utilise bath, shower and washing water to flush toilets, wash vehicles, water gardens, wash down hard areas etc. Contractors were encouraged to collect treated effluent water from the Gwaing Waste water Treatment Works (WwTW). On average 1 Ml/day was collected for use for construction activities, irrigation and other.

**Conventional Resources and Indirect Re-use of Treated Effluent**

The initial Bulk Water Resource Plan was reassessed and revised to reflect ease and speed of implementation of resources, while still being cost-effective. The schemes were reprioritised as indicated below. The first phase of the Re-use of Treated Effluent was identified as the top priority, not being directly dependent on rainfall, runoff and/or river flow. The investigation of groundwater potential and the Malgas River Pumping Scheme were reprioritised as the next two most preferred options.

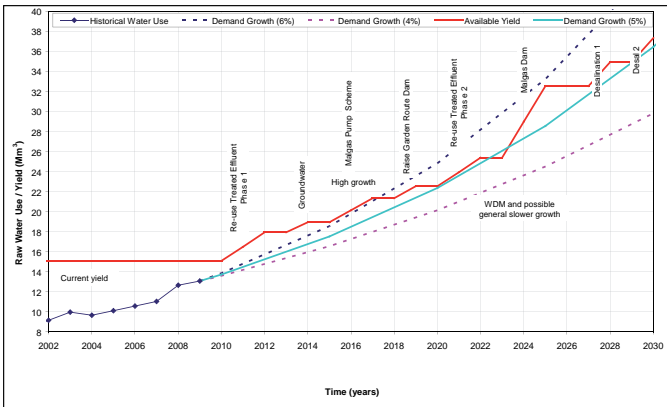


Figure 6: Reprioritisation of Augmentation Options

SSI Consulting Engineers was appointed for the plant and facilities for the treatment of effluent from the Outeniqua WwTW to provide a quality product that met the required standards for indirect re-use. The Outeniqua WwTW received the Wilson Award for the best medium sized works in South Africa in 2008. Aurecon was appointed for the pipeline and pump station to convey the treated product to discharge into the GRD.

The re-use of effluent project includes an ultra-filtration treatment plant at the existing Outeniqua waste water treatment plant, a pump station

and a 7.8 km pipeline to convey the treated water to be discharged into a tributary of the GRD. Treated water is diffused into the Garden Route Dam where it mixes with the natural raw water, which is pumped to the George water treatment works for treatment to potable standard, for distribution to users. The water treatment works have been modified to include the dosing of Powdered Activated Carbon (PAC) that is used to control unacceptable levels of Endocrine Disrupting Compounds (EDC's) that may be detected in the incoming raw water.

Uncontrolled indirect re-use has occurred in South Africa (e.g. the Rand) for many years, where sewer treatment works discharge effluent into rivers, the effluent mixes with the raw river water, and is extracted by downstream cities/towns to be treated to potable standards.

Diagrammatically the waste water treatment works and ultra-filtration process, together with the points of sampling for quality control, can be demonstrated as follows:

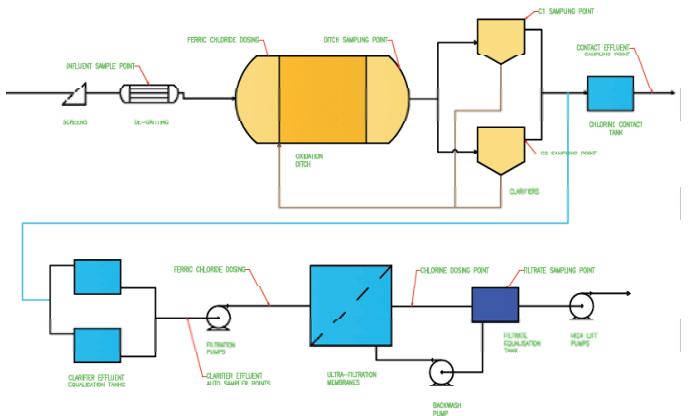


Figure 7: Treatment Process

George will be applying technology in a closed system where the quality of the effluent from the waste water treatment plant, the effluent treatment through ultra-filtration, the “raw” water discharged into the dam, and the final potable product will be managed, monitored, controlled and recorded. Any water that possibly does not meet the standard required for re-use can be diverted back to the Schaapkop River, where it will meet the DWA standards for discharge into rivers.

The quality of the treated effluent is, in fact, better than the quality of the raw water in the GRD.

There are five sampling points throughout the process, and the GM laboratory, situated at the Outeniqua WwTW, has acquired the necessary equipment to conduct all tests on site. Operators have received training, and the plant will be operated by the supplier for a minimum of three months while all personnel gain adequate on-site experience.

The fate of organic micro pollutants such as hormonal and pharmaceutical substances and EDC's in sewage treatment and the rate at which they degrade under natural environmental conditions is the subject of much research.

The ultra filters will remove the following:

- All the solids including colloids which may contain phosphorus thereby ensuring very low total phosphorus concentrations in the final product water
- Up to 99.9999% of all bacteria including cholera etc
- Up to 99.99% of all viruses
- All of the pathogens such as helminths, giardia and cryptosporidium (to all intents and purposes).

**Removal of EDCs etc in the ultra filters will be minimal.**

Water will then be pumped into the GRD where further die off of bacteria and viruses will occur due to ultra violet light penetration and the predation by higher organisms. The EDCs will be diluted by other water sources and will also break down to a relatively small degree in the dam, depending on such factors as retention time, sunlight effects etc. Nevertheless it is quite possible that the levels of EDCs etc in the feed water from the dam may increase particularly during e.g. periods of water shortage, when dilution will be at a minimum. Therefore a supply of PAC will be stocked at the George Water Treatment Plants. The indicators for EDC's will be monitored on a regular basis while recycling of the pre-treated effluent is being practised. If it is observed that the concentration of EDCs in the feed water is rising to unacceptable levels the PAC will be dosed into the water ahead of the water treatment plant in order to reduce the concentration to more acceptable levels.

**3.4 Catchment Management**

Controlled burning in the catchment of the Garden Route Dam, i.e. the Swart River catchment, has been recognized by the relevant role players as being critical to the maintenance of biodiversity, optimal stream flow regulation, control of alien invasive plant species, and wildfire pre-emptive protection. The catchment of the Swart River, falls within the jurisdiction of three land management agencies, namely the George Municipality (GM), the Department of Agriculture, Forestry and Fisheries (DAFF), and Cape Nature (CN).

The youngest vegetation is that of the 1996 "Bergplaas fire" which was almost 14 years ago, whilst the other vegetation ranged from 16 years and older. The vegetation on George Municipality land was over 25 years old.

To optimise runoff and prevent runaway veldfires (a serious risk in the drought ravaged), the option of burning the catchment was considered. From a cost-benefit this option was very viable, with predictions of approximately a 30% increase in runoff after the aged and dense undergrowth had been removed.

SSI Bohlweki was appointed to plan and facilitate the burn. Fynbos is dependent on periodic burning to germinate and generate new growth. In artificial environments close to developed areas, natural burning is curbed, as it is perceived to be a threat to safety and a pollutant. If burning does not take place, the following occurs:

- Certain plant species die due to age, do not produce seeds and certain species may die out completely
- Other less dominant species take over and new (unwanted) plant communities establish
- The water cycle is disrupted and both quality and quantity are compromised
- The veld presents a real fire danger of extreme heat with associated negative effects and potential for vast damage and losses

The fynbos in the catchment was very old, in fact so old that water runoff had been compromised by approx 30% or more. Due to the limited window of opportunity to burn - seasonal temperatures and wind conditions are a major factor - the project had to be implemented in the shortest possible time, and with the full co-operation of all parties. Controlled burning of the GRD catchment started on Friday 19 March 2010 and continued through to the last day within the burn window period on 14 April 2010. There was excellent co-operation between the various role players, including George Municipality, Eden District Municipality, Cape Nature, MTO Forestry, Sanparks, Working On Fire, African

Forestry and Ruiterbos Kontrakteurs. Runoff appears to have increased, although there is no means of measuring the actual increase. Runoff is dependent on many factors that have not yet been quantified and there are no pre-and post-burn comparisons - rainfall intensity, duration, quantity, soil moisture etc

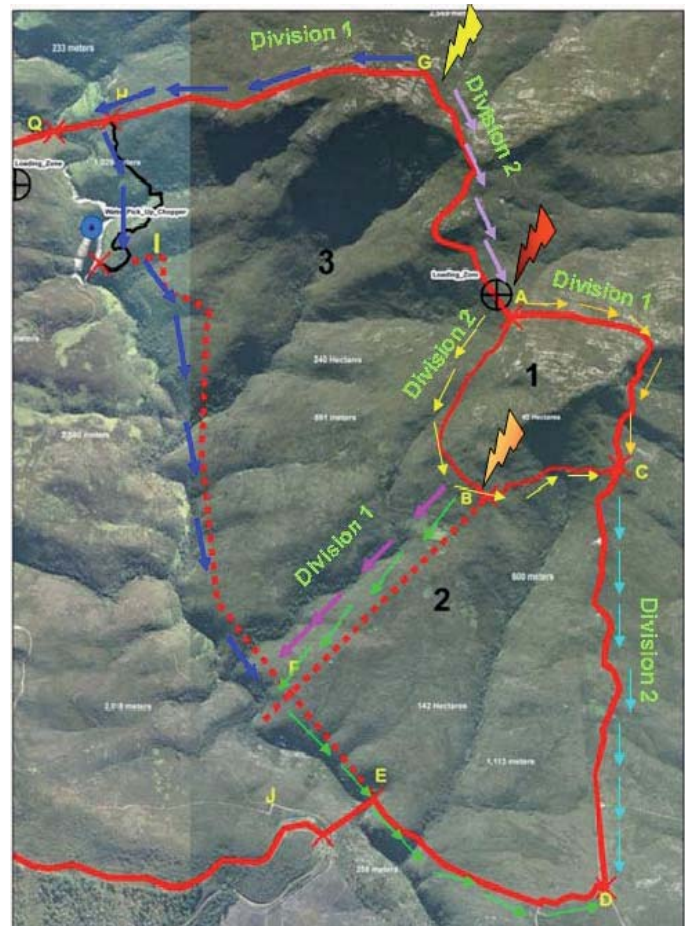


Figure 8 : Map illustrating locality of proposed controlled burn

**3.5 Ground water**

During the 2005 study of the bulk raw water resources, a report was compiled that indicated limited ground water resources in the George area. The potential was estimated between 2,5 and 3,0 Ml/day. Eden District Municipality provided R1.5 million for the drilling of exploratory boreholes. Twenty boreholes were drilled, varying in depth, generally between 180m and 300m, and yields proved beyond initial expectations in the Table Mountain Sandstone, with the Cape Granite not yielding significantly. The quality of the ground water is generally excellent, with high iron and manganese content that can easily be treated. Three boreholes have been equipped, with a combined delivery of approximately 2,8 Ml/day. Disappointingly little information is available on ground water in the region, and so all boreholes have been fitted with loggers. Even if a borehole is not utilised, these loggers will provide valuable information for future use. On enquiry, it was found that no information is available on existing boreholes in the region. Users are not recorded on a register, and there is no monitoring of extraction. Thus the effect of the drought on ground water is unknown. The boreholes that have been equipped will only be utilised in times of crisis until more information is available on the sustainability of the ground water reserves.



### 3.6 PUBLIC AWARENESS CAMPAIGNS

#### 3.6.1 Eden District Municipality Public Awareness Campaign

In co-ordination with Eden District Municipality, the following actions were initiated:

- Radio advertisement campaign with Eden FM: A 5-7 minute competition every morning with respect to water awareness; jingles relating to “wise water use” throughout the day; 1 hour and half hour broadcast slots twice per week by different water / municipal experts
- Billboards : Erected at entrances to the Eden district; Individual billboards & banners erected within the urban areas and at entrances to the city and main suburbs
- Newspaper advertising: Newspaper adverts placed in George Herald, Die Son, Die Burger
- Promotional items to create awareness - T-shirts, bumper stickers, mouse pads, license disc stickers
- Prominent signage at strategic locations e.g. airport

#### 3.6.2 George Municipality Public Awareness Campaign and General Measures

- Banners on main access roads
- Lamp post posters for certain areas in George
- Billboard signage at main entrances to various areas
- Posters at public places : municipal offices, libraries, clinics, etc.
- Information on digital screen in accounts payment offices & plasma screens in municipal offices and other areas in town
- SMS messages sent by all schools with SMS system
- Presentations for business groups (hoteliers, estate agents, school principals, Chamber of Commerce)
- Presentations done at all schools
- Competition between schools to initiate water saving
- Brochures on Water Saving for high bulk users, schools, hostels, prisons, hotels
- Information centre during November 2009 at the regional mall, the Garden Route Mall
- Presentations & information for Ward Committees
- Information printed on rates, water & electricity accounts
- Water Saving Tips publicized in prominent places
- Water savings pamphlet distributed with municipal accounts
- Press releases to George Herald, Die Burger, EP Herald & Cape Argus
- ‘CAUGHT WASTING WATER’ campaign & press releases in newspapers
- Presentations to all municipal employees
- High water users identified & approached individually to cut water use
- Repairs to leaks in indigent areas done free of charge and advertised
- Airlines contacted & requested to make announcements on landing
- Tour companies alerted to drought situation

#### 3.7 Monitoring of Users

A technician was appointed to monitor water users. Household consumption was limited to 15 kl/month and excessive consumption was monitored, and followed up with a personal call. This produced remarkably positive results as can be seen from the table below:

Table 1: Monitoring of Domestic Water Users

Water Usage	Sept 2009	Dec 2009	% Reduction
15 - 50Kl	8990	7185	20.1
50 - 100Kl	548	398	27.4

100 - 150Kl	82	50	39.0
150Kl +	52	27	48.1

Industrial users were also monitored and visited on site to discuss water saving options.

### 3.8 ADDITIONAL MEASURES

- Public showers & taps at beaches disconnected.
- Public taps disconnected on municipal property e.g. at graveyards.
- Campaign to ensure each public toilet has a brick/hippo bag, and residents install flow reducing devices to private showers and taps.
- Indigents encouraged to report leaks in their homes. These are repaired at no cost.
- A 24 hour crime-line for reporting water abuse.
- Additional law enforcement personnel to monitor water abuse and enforce restrictions.
- Roving road blocks to hand out pamphlets.
- Intense promotion of rain water harvesting.
- Internal Drought Management Committee - meet 3 times per week (Dept: Civil Engineering Services, Dept: Financial Services, Dept: Community Safety)

### 4. ASSESSMENT OF WATER DEMAND DURING DROUGHT CONDITIONS

In order to determine the minimum water requirement, an assessment was done on what was required to meet the basic demands of the approximately 190 000 residents of George to ensure sustainability and prevent social and economic collapse.

- basic level of service - residents (litres per capita per day)
  - Water consumption 25 lcd
  - Flushing sanitation 40 lcd
  - *Basic requirement 65 lcd*
- total minimum water required (Mega-litres per day)
  - Approx 190 000 residents
  - 190 000 x 65 lcd = 12,35 Ml/day
  - Other services = 1,235 Ml/day
  - Industries & business = 5,9 Ml/day
  - *Total minimum requirement = 19,485 Ml/day*

OPTIONS AVAILABLE - worst case scenario

Volumes available (Mega-litres per day):

Re-use of treated effluent Phase 1 = 10,0 Ml/day

Boreholes (3 No) = 2,5 Ml/day

Malgas Pump Scheme - rainfall dependent = [5,0 Ml/day]

Re-use of treated effluent Phase 2 = 5,0 Ml/day

Block burning of Swart & Kaaimans River catchment = unquantified

Installation of flow reducing devices - reduce usage = unquantified

TOTAL POSSIBLE VOLUME

= 17,5 to 22,5 Ml/day

### 5. CHALLENGES

#### 5.1 Financial

The projects needed to be financed, and as no specific provision had been made on the 2009/2010 budget, the funding of projects posed a dilemma. The capital budget was reprioritised to effect as many savings as possible to finance emergency schemes.

Applications were submitted to Provincial Disaster Management, Provincial Treasury and National Treasury. Before emergency grant funding will be considered, the applicant must prove the following:

- the disaster is unforeseen and could not be anticipated or planned for
- the applicant has exhausted all own sources of revenue
- the measures to be implemented must address short term emergency, and long term sustainable solutions

The George Municipality was allocated a R15 million grant in the 2009/10 National financial year. The application submitted was far in excess of this amount and the reason for the amount approved was due to a misinterpretation of the information provided by George Municipality. This indicated a possible shortage of technical expertise in assessing applications for emergency funds.

A second application was submitted and George Municipality was allocated R75 million on the 2010/11 National Budget. Due to various reasons, the first transfer of R50 million, due for payment in April 2010, was only received in early July 2010.

Delayed transfers resulted in a financial dilemma for the municipality as the bridging finance was not available so close to the end of the municipal financial year.

To prevent delays in funding transfers in future disasters it would be preferable to receive payments directly from National Treasury, and not to have funds channelled through other departments, in this instance Department: Water Affairs.

### 5.2 Time

The implementation of projects became a race against time to ensure the continued provision of basic water to the community. The looming December / January season not only meant an influx of holiday makers and increased demand, but also the builders break and the shut-down of suppliers.

### 5.3 Reduce Consumption

The Department: Water Affairs placed a 40% reduction in consumption for all towns within the drought stricken area. Targets were set that had to be achieved by the residents.

Month	Historical Average Rainfall	2008 (mm)	2009 (mm)	2010 (mm)	Dam Level % 2009	Dam Level % 2010	Average Daily Use ML (2009)	Average Daily Use ML (2010)	% Saving (2009)	% Saving (2010)
January	57.5	59.4	9.7	20.4	80	19.5	34.40	22.92	8.52%	39.05%
February	53.2	61.2	47.3	63.2	75	21.8	33.42	23.87	11.12%	36.52%
March	66.5	48.7	4.8	11.6	61.8	24.6	33.46	22.70	11.02%	38.81%
April	66.2	19.3	44	27.6	52.8	23	32.76	22.03	12.80%	41.41%
May	45.8	6.6	5.1	17.0	45.4	20.6	31.81	23.67	15.40%	37.05%
June	38.5	68.3	50.7	99.3	39.1	30.3	31.26	22.07	16.87%	41.30%
July	42.3	11.6	42.7	85.2	36.3		30.92	22.42	17.87%	40.37%
August	65.9	63.2	14.2		32.2		31.01		17.53%	
September	50.39	24.5	43.4		27.6		28.78		23.46%	
October	81.7	49.0	44.9		26.7		27.11		27.90%	
November	75.7	162.3	30.3		22.6		26.35		29.93%	
December	67.2	2.0	38.1		23		25.08		33.38%	
Annual Ave	712.3	576.1	375.2							

2009 Lowest Rainfall in Recorded History (133 years) • Lowest Recorded Dam Level on 22 February 2010 = 16.9%

Figure 9 : Water situation as reported on 31 July 2010

### 5.4 Political

The full support of politicians must be obtained at the first detection of a disaster situation. Difficult political decisions had to be made e.g.

sourcing finances and reprioritisation of services budgets, taking away the first free 6kl of water per household (only indigent households were given the first 6 kl/month free), the implementation of emergency tariffs. Decisions need to be made at the highest possible level and any dissent can cause critical delays.

### 5.5 Public Co-Operation

As can be seen from the water situation table above, the co-operation of the residents was exemplary. To obtain the savings achieved required the full buy-in of residents. This can be attributed to an intense and very successful public awareness campaign.

### 5.6 Peak Season

The peak December / January season posed a huge challenge, as historically this season is the highest consumption period. Due to pre-awareness campaigns, road blocks, media coverage etc, and the co-operation of accommodation services providers, the peak season saw the lowest consumption achieved in 2009. Many of the highest industry consumers are closed during this period, and consumption is mainly residential and the guest industry.

### 5.7 Fire Hazard

Given the extremely dry conditions and the state of the vegetation, fire hazard was a real threat. Not only was there an increased hazard due to the drought and heat, but water for fire fighting purposes could barely be spared. Warning signage was erected throughout the region to sensitise people to the threat.

### 5.8 Drought Duration

It was uncertain whether the drought was still a young drought, and the duration could not be determined. Drought management planning had to incorporate a short and longer term drought period to prepare for the possible eventuality that the drought would last for a number of years.

## 6. CONCLUDING REMARKS

- The projects implemented covered the whole spectrum of water management options, from water demand, re-use, ground water, conventional and included an intensive public awareness campaign;
- The drought is not over, and this case study could be an example for other water authorities faced with similar challenges;
- The indirect re-use of waste water for potable use will be a first for South Africa;
- Without having the necessary bulk water resource planning in place for a number of preceding years, George Municipality would not have been able to manage a drought of this magnitude with the success that has been achieved;
- All thanks must go to the Eden and Provincial Disaster Management Units who tirelessly provided support and assistance throughout, with the back-up of the Dept: Water Affairs, National and Provincial Treasury, Eden District Municipality, Dept: Environmental Affairs and Development Planning;
- The management of a crisis of this magnitude can never be attributed to a single person or department, but to the co-ordinated efforts of a multi-disciplinary and dedicated team, and co-operative governance.