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TERMS OF REFERENCE

WATER RECONCILIATION STRATEGY STUDY FOR THE KWAZULU-NATAL COASTAL METROPOLITAN AREAS

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GLOSSARY

CMA	Catchment Management Agency
DM	District Municipality
DWAF	Department of Water Affairs and Forestry
EIA	Environmental Impact Assessment
EOIs	Expressions of Interest
HDE	Historically disadvantage enterprise
HDI	Historically disadvantage individual: a South African citizen: • Who had no franchise in national elections prior to the introduction of the Constitution of the Republic of South Africa, 1983 (Act No 110 of 1983) or the Constitution of the Republic of South Africa, 1983 (Act No 200 of 1993) ('the Interim Constitution') and/or • Who is a female; and/or • Who has a disability. Provided that a person who obtained South Africa citizen on or after the coming to effect of the Interim Constitution, is deemed not to be an HDI.
LM	Local Municipality
MM	Metropolitan Municipality
MMTS	Mooi-Mgeni Transfer Scheme
NWRP	National Water Resource Planning
NEMA	National Environmental Management Act
PSP	Professional Service Provider
RO	Regional Office
ROD	Records of Decision
SSC	Study Steering Committee
ST	Study Team
STC	Study Technical Committee
SWTW	Southern Waste Water Treatment Works
SWWRP	Southern Waste Water Reclamation Plant
URV	Unit Reference Value

WARMS	Water Use Authorization Management System
WC/WDM	Water Conservation/Water Demand Management
WRPM	Water Resources Planning Model
WSA	Water Services Association
WSP	Water Services Provider
WTW	Water Treatment Works
WUA	Water User Association
WMA	Water Management Area

1. INTROCUCTION

1.1 Background

In June 2006 the Directorate of National Water Resources Planning of the Department of Water Affairs and Forestry (DWAF) invited Professional Service Providers (PSPs) to submit Expressions of Interest (EOIs) for the Water Reconciliation Strategy Study for the Kwa-Zulu Natal Coastal Metropolitan Areas. Shortlisted Study Teams are now invited to submit Proposals for this study.

The need for the Reconciliation Study was identified in DWAF's report entitled "Internal Strategic Perspectives for the Mvoti to Mzimkulu Water Management Area". This need has arisen because the water requirements of the Kwa-Zulu Natal metropolitan coastal areas are growing rapidly and will soon exceed the supplies available from the existing North Coast and Mgeni Water Supply Systems. Therefore there is an urgent need to identify and confirm interventions required to meet the imminent potential shortfalls in supply. There is also a need to set in place a strategy for selecting and prioritizing such interventions, and to determine the actions that will be necessary to ensure their timely implementation to reconcile the supply with a range of longer term water requirement scenarios for the next 25 years.

The contents of this document are outlined below:

- Section 2 describes the KwaZulu-Natal North Coast Supply Area.
- Section 3 describes the Mgeni System.
- Section 4 outlines the Scope of the Assignment and Programme
- Section 5 describes the Format for Proposals and Arrangements for Submission.

1.2 The KwaZulu-Natal North Coast Supply Area

1.2.1 Water Requirements

The water requirements of the KwaZulu-Natal North Coast are growing rapidly on account of the current economic growth and the large number of high income and sub-economic residential developments being implemented and planned along the coast between the Tongati and Thukela Rivers within the iLembe District Municipality (DM). Morelands (Tongaat Hewlett) is one of the larger developers of high-income residential estates, many including golf courses in both the iLembe DM and eThekwini Metropolitan Municipality (MM).

The development of the Dube Trade Port, which includes the King Shaka Airport and the commercial and residential development that the Trade Port will attract in the vicinity of La Mercy will also place increasing demands on the North Coast water supply system. This area within eThekwini MM is supplied from Hazelmere Dam , which is already under pressure.

On the other hand, the water requirements of irrigators from both the Mvoti and Mdloti Rivers have reduced over the past 10 years.

1.2.2 Existing Supplies

1.2.2.1 Urban and Industrial Use

The North Coast System extends from Verulam to the Thukela River. Umgeni Water is the main Water Services Provider (WSP) and eThekwini MM and iLembe DM the main Water Services Authorities (WSAs), but are also the WSPs from various smaller sources of supply. Some of these sources of supply are shown in **Figure 1** and are described below.

Umgeni Water's North Coast System

Hazelmere Dam supplies Umgeni Water's North Coast System comprising the Hazelmere WTW, pump station and the following pipelines shown on Figure 1:

- The Ballito-Honolulu-Stanger pipeline serves the towns northwards from the Mdloti River to Stanger. Stanger is only supplied when the local supply from the Mvoti River is insufficient.
- The Waterloo pipeline extends to Mdloti Beach (south east of Verulam).
- The Ndwedwe pipeline supplies Ndwedwe (north west of Verulam).
- The Grange pipeline to Verulam can be reversed to supply Verulam from eThekweni MM's Northern Aqueduct at Phoenix.

Other Smaller North Coast Supplies

Some of the smaller supplies for urban and industrial users are shown in Figure 1 and are described below:

Mvoti River
ILembe DM supplies Stanger from an abstraction works on the Mvoti River and an aging water treatment works. During periods of zero or very low river flow, trenches are excavated into the river alluvium to augment abstraction.

SAPPI and the Gledhow Mill abstract run-of-river water for industrial purposes from the Mvoti River from just upstream of the Mvoti estuary.

Tongati River
Tongaat Hewlett owns the Syphon Dam and the Dudley Pringle Dam on the Tongati River, from which eThekwini MM have rights to abstract 15 Ml/day for treatment at their Tongaat WTW to supply the town of Tongaat. The supply to this area can be supported from the North Coast system when needed.

Other Minor Surface Water Sources
Other smaller towns on the western fringes of the supply area are supplied from an abstraction weir on the Mhlali River.

Darnall is supplied from a dam belonging to the local sugar mill.

Ground Water
The northern coastal villages such as Zinkwazi and Blythedale are supplied from local boreholes.

1.2.2.2 Irrigation

Irrigators are supplied from Hazelmere Dam and abstract water on a run-of-river basis from the Mvoti River and from other rivers. There has been a reduction in irrigation usage and no new large irrigation schemes are currently planned.

1.2.3 Previous Investigations into Interventions

A number of studies of water conservation and demand management interventions, possible additional sources of supply, and bulk distribution infrastructure have been undertaken by DWAF, Umgeni Water and Mhlatuze Water. Some of these studies and the various interventions investigated are outlined below.

Water Conservation and Demand Management

DWAF's KwaZulu-Natal North Coast (Mdloti to Thukela) Water Conservation and Demand Management (WCDM) Assessment Study assessed existing WCDM interventions and prioritized further WCDM interventions. Options for delaying the date of raising Hazelmere Dam by extending the service life of ILembe DM's Stanger WTW were also investigated.

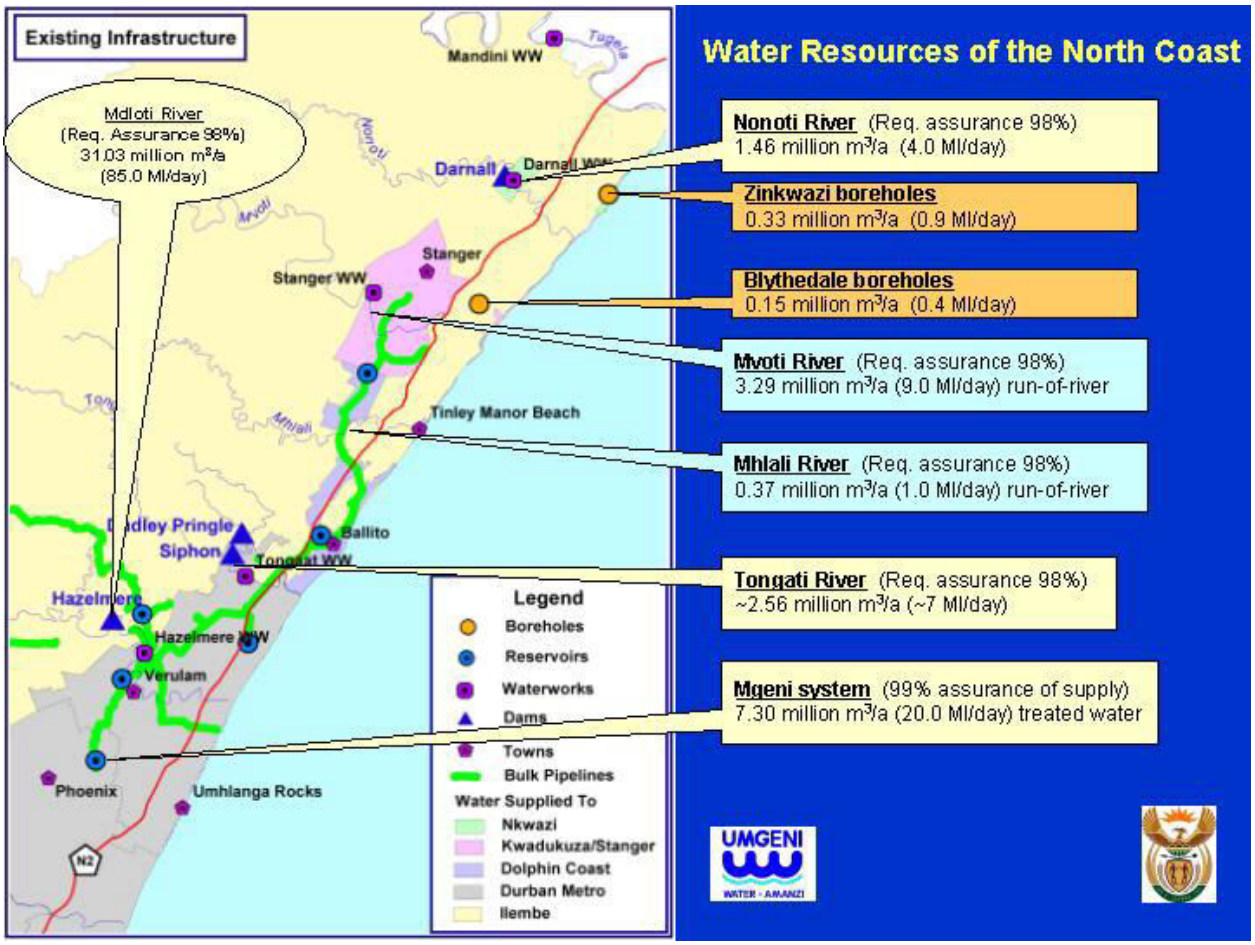

Figure 1. The KwaZulu-Natal North Coast supply area and its water resources.

Mdloti River

DWAF's Raising of Hazelmere Dam Feasibility Study showed that if no Environmental Reserve releases are made (other than releases for downstream irrigators), then in spite of the reduction in yield due to siltation, raising the dam would reinstate the yield of the dam sufficiently to serve the North Coast System until about 2008/09 as indicated in **Figure 2**. This option is included in ***Umgeni Water's Infrastrucure Plan 2004.*** However if the Environmental Reserve were to be implemented immediately following raising of the dam then there would be no increase in the yield, as shown in **Figure 3**. Therefore consideration might be given to requesting DWAF to limit the Environmental Reserve releases to those required to maintain the present day Class of the Mdloti River and Estuary, or possibly to release treated waste water effluent into the river to improve low flows, if this would meet some of the Environmental Reserve requirements.

Umgeni Water's proposed improvements to their North Coast bulk distribution infrastructure to supply the additional yield from the raised Hazelmere Dam are as follows:

- Upgrading of the Hazelmere WTW and pump station.
- Duplication of the Hazelmere WTW to the bifurcation of the pipeline.
- Duplication of the Ballito-Honolulu-Stanger pipeline. Consideration is being given to designing this pipeline for bidirectional flow so that a future supply from a dam on the Mvoti River or a supply from the Thukela River could also be distributed through this pipeline.
- A new pipeline from the vicinity of Honolulu to Blythedale, although other options for supplying Blythedale are also under consideration.

Preliminary estimates of the cost of raising Hazelmere Dam and upgrading the associated bulk distribution infrastructure were prepared by Umgeni Water and are presented below. These indicate the importance of taking the cost of this infrastructure into account when evaluating the interventions:

Raising Hazelmere Dam (DWAF)	R 30 million
Waterworks upgrade	R 49 million
New waterworks pump station	R 10 million
Pipelines	R112 million
Upgrade Umhlali Reservoir	R 5 million

Mvoti River

DWAF's Mvoti River Development Feasibility Study considered dam development for both urban domestic and industrial usage and for irrigation usage. The study identified the iSithundu Dam on the Mvoti River, just upstream of the confluence of the Hlimbitwa (middle catchment), and other dam sites such as Mvotipoort (in the upper catchment near Mvoti Vlei), Hlimbitwa (on the Mvoti just downstream of the confluence with the Hlimbitwa) and Welverdient (in the lower catchment a few kilometers upstream of the Stanger abstraction works).

DWAF's Mvoti River Development Feasibility Study Extension took account of the irrigators inability to contribute towards a new dam and identified a number of dam sites on the Mvoti and its tributaries which would be more suitable for urban supply on account of their closer proximity to the urban users. Of these the Welverdient site appears to be the most favourable.

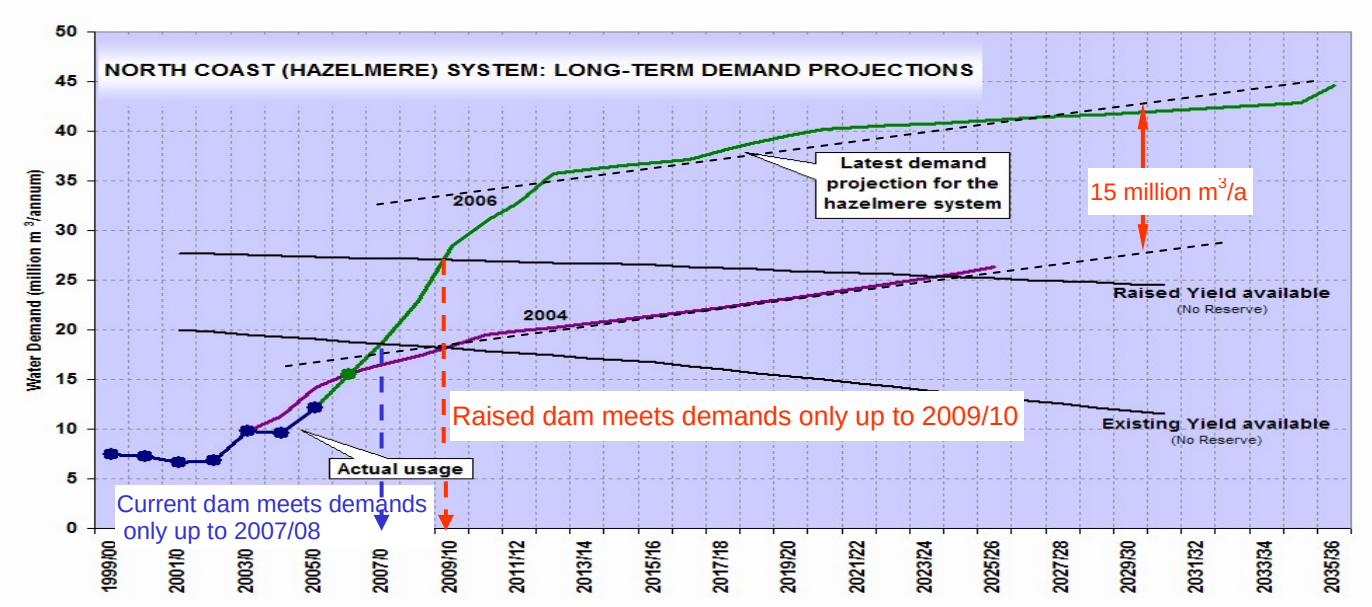

Figure 2 **Demand projections and yields of the Hazelmere Dam with no environmental Reserve releases**

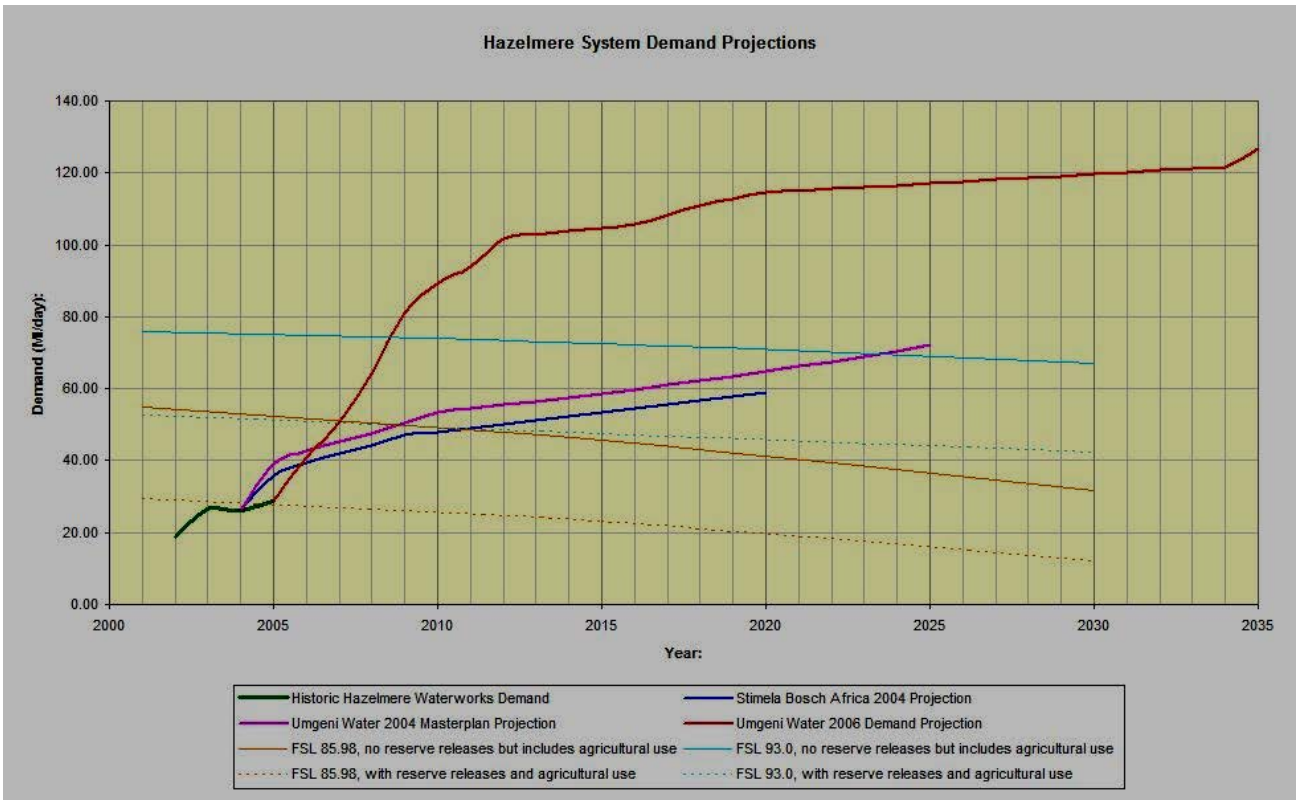

Figure 3. **Demand projections and yields of the Hazelmere Dam with and without Environmental Reserve releases**

Umgeni Water's Feasibility Study investigated various sites for a regional water treatment plant from which Stanger and Umgeni Water's North Coast bulk distribution infrastructure could be supplied. The study selected the Mvoti View site for the following reasons:

- Water could be abstracted at the existing diversion weir and tunnel on the Mvoti River (as described above) and stored in an off-channel storage dam on the other side of the mountain in the same gorge as the Welverdient dam site but at a point north-west (downstream) from it.
- Water could be pumped to the treatment plant on top of the mountain at Fawsley Park and then stored in a large reservoir commanding the whole supply area, including Stanger.

Groundwater

ILembe District Municipality's Mvoti Wellfield Study has recently been commissioned to investigate the development of a wellfield to abstract water from the Mvoti River alluvium to supply ILembe DM's Stanger WTW. Both Sappi and Gledhow Mill have recently developed wellfields in the alluvium further downstream.

ILembe District Municipality's WSDP indicates that some development of groundwater sources will be implemented and the Municipality has recently completed a report on coastal and inland **Groundwater Potential**.

Thukela River

Mhlathuze Water has proposed that their system supplying Sundumbili on the northern bank of the Thukela River be extended and that a pipeline be laid to Stanger. This might prejudice future water supply to Richards Bay as the bulk of unutilized water in the Lower Thukela is currently licensed to Mhlathuze Water for use in the Mhlathuze Water supply area.

Mgeni System

The eThekwini MM's aqueduct from Durban Heights to Phoenix supplies Inanda, where demands are rapidly growing. The eThekwini MM has recently taken the decision to construct the Western Aqueduct from Umlaas Road Reservoir to the Inanda area to augment the supply to Inanda (amongst others), although this will place increasing pressure on the water resources of the upper Mgeni System which are already stressed.

Desalination

Umgeni Water has proposed that a small local desalination plant be provided to supply ***Zinkwazi*** as a short-term solution for the area. It is envisaged that seawater would be extracted from beach wells to supply the plant. Desalination of sea water or of saline groundwater may be an interim to long term option for some of the golf estates and an option for a major scheme in the medium to longer term.

Utilization of Waste Water

The Sappi Paper Mill currently utilizes 6 to 8 Ml/day of effluent from Stanger's Waste Water Treatment Works. Various other schemes for utilizing waste water have been proposed including the possibility of providing the environmental Reserve of the Mdloti River below Hazelmere Dam, thus making additional water from the dam available (as discussed above). Other options for using effluent are the exchange with irrigators of fresh water, the irrigation of golf estates and potable usage after ultrafiltration or possibly desalination. There is also the possibility of collecting water in the areas surrounding Tongaat for recycling to a suitable standard to augment the North Coast Supply System.

1.2.4 Reserve

DWAF's RDM office has commissioned the eThekweni Municipality to determine the intermediate level ecological Reserves for the Mdloti and Tongati estuaries. In the case of the Mhlanga estuary, it has already been decided that effluent from the waste water treatment works should not be discharged into the estuary as this would compromise the Reserve, and therefore a pump station and pipeline to discharge the effluent into the Piesang River tributary of the Mgeni River are currently under construction.

1.2.5 Reconciliation of Requirements and Supply

The results from the Water Resources Planning Model (WRPM) set up for the Hazelmere Dam are reflected in Figures 2 and 3 and show that if requirements continue to grow as anticipated then the yield of Hazelmere Dam will be exceeded by about 2007/08. Even if this dam is raised then its yield would be exceeded by about 2009/10 if no Reserve releases are made from the dam. Therefore additional interventions to supply this area are urgently required. Some of the possible short-term and longer-term interventions that could be implemented were outlined above.

1.3 Mgeni System

1.3.1 Water Requirements

Umgeni Water is the WSP for the Mgeni System which supplies water from DWAF's Midmar, Albert Falls, Nagle and Inanda dams to the main WSAs, Msunduzi Local Municipality (LM) supplying Pietermaritzburg and its suburbs and eThekwini MM supplying Durban and its surrounding areas. Umgeni Water also supplies water from the system to a portion of the uMgungundlovu DM, the large rural area surrounding Pietermaritzburg, and soon to a portion of Ugu DM along the South Coast.

The eThekwini MM uses approximately 80% of the supply, Msunduzi Municipality about 11% and the other WSAs about 9%. The total water requirements increased from about 310 million m^3/a in 2001/2002 to about 350 million m^3/a in 2004/2005. This rapid growth in requirements is attributed to migration into the area, improved standards of living and strong economic growth, which is likely to continue with the proposed development of the Dube Trade Port which includes the planned King Shaka Airport (previously La Mercy).

Umgeni Water and the eThekwini MM are both involved in the assessment of current water requirements and in forecasting future requirements as outlined below, but would welcome the development of a user-friendly model for evaluating possible future scenarios:

- Umgeni Water utilizes various models to predict future water requirements for planning purposes. It makes 18-month projections for short-term financial planning and 30 year projections for capital expenditure.

- eThekwini MM is doing the following:
  - It has demarcated the Metropole into 4 main areas and has classified land use within those areas.
  - It has appointed a consultant to analyse water use in the areas served by each of Umgeni Water's bulk meters and to correlate developments with demand.

- It produced aerial photographs of land use in its supply area in 2003, 2005 and 2006 in order to count dwellings and reconcile population with water requirements. Comparison of the 2003 and 2005 analyses shows that there is considerable migration into the area and huge growth of informal settlements inside the Metropolitan boundaries.
- The consultant is also correlating waste water flows with water use. In this regard waste water flows in Umhlanga show an anomaly, as these have not increased over the last four years in spite of a significant increase in water usage.

1.3.2 Existing Supplies and Infrastructure

The main dams, water treatment works, aqueducts and bulk supply pipelines of the Mgeni System are shown schematically in **Figure 4**. The bulk supply infrastructure is owned by Umgeni Water, except those components which are owned by the eThekwini MM, as identified below. Umgeni Water has developed a Visio-based model of the bulk supply system which can facilitate the selection of bulk reticulation requirements associated with various interventions.

The Mgeni System comprises a number of complex and interwoven dam and distribution systems which are operating at near full capacity and therefore provide little flexibility. Hence the appointed PSP would need to liaise closely with Umgeni Water and the eThekwini MM concerning the implications of any future interventions on the bulk distribution systems and their integration into these systems.

Normal text is used to describe the existing systems and *italics text to indicate proposed or suggested changes to the systems.*

Mooi Mgeni Transfer Scheme Phase 1
The Mooi Mgeni Transfer Scheme Phase 1 (MMTS I) comprises a small dam at Mearns on the Mooi River from which water is pumped via a pipeline which discharges into a tributary of the Mgeni River upstream of Midmar Dam.

Midmar Dam and the Midmar Water Treatment Works
- Water is pumped (against about 10 metres head) from Midmar Dam to the Midmar Water Treatment Works (WTW), which has a capacity of 250 Ml/day. A small proportion of the treated water is supplied to the Howick and Groenekloof Systems but most of the flow gravitates to Msunduzi LM and the western suburbs of eThekwini MM as described below.
- Most of the water is conveyed from the Midmar WTW via a tunnel and the ‘251 and ‘61 pipelines to the World's View Reservoir from where the ‘61 pipeline supplies Msunduzi LM from various off-takes along its route to the Umlaas Road Reservoir, where the remainder of the flow is delivered.
- From the Umlaas Road Reservoir the existing pipelines distribute water to eThekwini MM's distribution system serving its western suburbs, including Camperdown and Hillcrest, where water requirements are growing fairly rapidly.

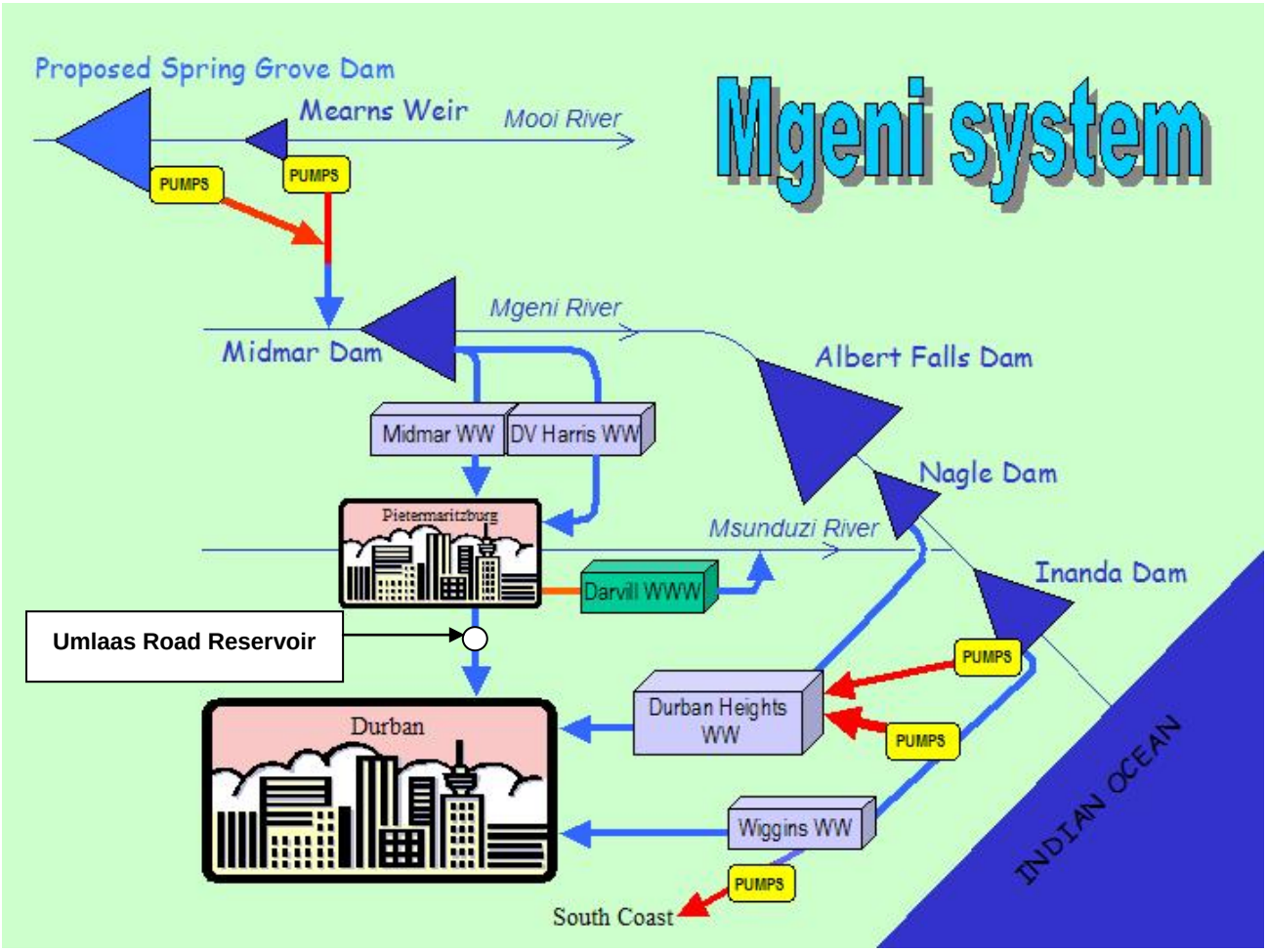

Figure 4. Schematic of Mgeni System dams and bulk distribution infrastructure

Midmar Dam and DV Harris Water Treatment Works

- Water gravitates via the '51 pipeline from Midmar Dam to the DV Harris WTW, which has a capacity of 120 Ml/day, and currently supplies the Msunduzi and Wartburg Systems but could also supply Umlaas Road as described below.
- *The '53 pipeline from the DV Harris WTW to the Umlaas Road Reservoir is currently not in use but it is proposed that this be recommissioned and reconfigured to augment the supply to Umlaas Road to serve eThekwini MM's proposed bulk supply "Western Aqueduct".*
- *It has also been suggested that an additional pipeline, which would be known as the " Northern Feeder", be laid from the DV Harris WTW to the Umlaas Road Reservoir.*
- *eThekwini's proposed "Western Aqueduct" (budgeted cost R400 million) from downstream of the Umlaas Road Reservoir could possibly augment the following supplies:*
    - *The supply to Inanda where the rapid growth in requirements will soon exceed the 180 Ml/day capacity of eThekwini MM's existing "eThekwini Northern Aqueduct" from Durban Heights to Phoenix.*
    - *The supplies to the suburbs from Cato Ridge to Pinetown South where the growth in demand is also exceeding the capacities of eThekwini MM's existing bulk distribution pipelines.*

Albert Falls and Nagle Dams and Durban Heights Water Treatment Works

- Water is released from Albert Falls Dam to Nagle Dam from where it is conveyed by twin gravity aqueducts (tunnels and pipelines) to the Durban Heights WTW at RL 270 m, which has a capacity of 614 Ml/day.
- The Durban Heights WTW can also be supplied with water from Inanda Dam. Water can be pumped at a rate of 120 Ml/day from a combination of 2 pump sets – one at Inanda Dam and the other in the Wiggins aqueduct and pipeline that pass close to Durban Heights.
- All water from the Durban Heights WTW is distributed by eThekwini MM's bulk supply pipelines to their various systems:
    - eThekwini MM's Northern Aqueduct System and the "eThekwini Northern Aqueduct" itself serving the rapidly growing Inanda area *to which the supply will be augmented by eThekwini MM's proposed "Western Aqueduct", as described above.*
    - eThekwini MM's Kwa-Debeka and Mt Moriah systems.
    - eThekwini MM's Durban South System which also supplies its Northdene 3 system.

Inanda Dam and Wiggins Water Treatment Works

- Wiggins WTW is supplied by a gravity pipeline and an aqueduct (tunnel system) from Inanda Dam (which together can simultaneously supply 120 Ml/day to Durban Heights WTW and 350 Ml/day to Wiggins WTW). Wiggins WTW is sited at RL 90 m and has a capacity of 350 Ml/day. Inanda Dam and the Wiggins WTW are currently not fully utilized on account of the relatively low elevation and the limited area which the Wiggins WTW can supply by gravity.
- All water from the Wiggins WTW is distributed by eThekwini MM's various bulk supply systems ,including its "South Coast Augmentation Pipeline".
- *Umgeni Water plans to abstract water from eThekwini MM's "South Coast Augmentation Pipeline" at Amanzimtoti to serve Ugu DM's growing demands as follows:*
    - *Umgeni Water's pipeline would initially extend from Amanzimtoti to Park Rynie but would later be extended to Hibberdene.*
    - *The section of pipeline from Amanzimtoti to Umkomaas will be designed to operate bidirectionally.*
    - *The design capacity will be 65 Ml/day with an initial water requirement of 35 Ml/day to be supplied.*
    - Umgeni Water's existing Nungwane Dam on the Nungwane River, a tributary of the Lovu River, currently supplies the Amanzimtoti WTW and will be supported by the South Coast Augmentation Pipeline. This dam has a firm yield of 9 Ml/day but supplies more water during normal and wet years and during the peak summer season. The WTW's capacity is 24Ml/day.

1.3.3 Future Schemes and Water Resources Planning

DWAF has undertaken a number of studies of schemes to augment the supplies to the Mgeni System, whereas Umgeni Water and eThekwini MM have addressed the bulk distribution systems, and eThekweni MM and Msunduzi LM have also concentrated on implementing WCDM interventions as outlined below.

Water Conservation and Demand Management

Water conservation and demand management (WCDM) has been shown to be one of the most cost-effective options, however local experience has shown that this cannot always be relied on to contain demands as planned. The eThekwini MM had previously predicted that it would be able to curtail water demands through its WCDM program, but this has not been completely successful as requirements are currently growing very rapidly in spite of the following initiatives:

- Unaccounted for water (UAW) or non-revenue water is closely monitored and investigated but is currently 32% in eThekwini MM and 49% in Msunduzi LM. Some of eThekwini MM's losses can be attributed to the relatively recent incorporation of surrounding areas into the metropolitan area.
- Their consultant is responsible for reporting on losses determined by measuring night flows, and for recommending WCDM interventions like pressure management.

Mooi-Mgeni Transfer Scheme

DWAF's Pre-Feasibility and Feasibility Reports provide details of the following schemes and other options that have been investigated:

DWAF's Spring Grove Dam is to be constructed by the TCTA in the near future. This scheme, known as the Mooi-Mgeni Transfer Scheme Phase 2A (MMTS-2A), will augment the supply of the Mgeni System by about 47 million m^3/a. Water will be released from Spring Grove Dam to Mearns Weir for transfer using the existing Pumping Station.

Phase 2B of the Mooi-Mgeni Transfer Scheme (MMTS-2B) comprises a new pumping station at Spring Grove Dam and transfer infrastructure to increase the overall transfer capacity to 4,3 m^3/s. This scheme will be implemented as the last phase of this scheme and will augment the yield of the System by an additional 13 million m^3/annum.

The possibility of transferring water from the **Boesmans River** (a tributary of the Thukela River) to Mearns could be considered, however, the impact on DWAF's proposed Mielietuin Dam, which forms part of their plan for the development of the Thukela River, would have to be taken into account.

Mkomazi-Mgeni Transfer Scheme

DWAF's Mkomazi-Mgeni Transfer Scheme Pre-Feasibility Study (1999) identified eight possible schemes for augmenting the supply of the Mgeni System by about 200 million m^3/annum, of which five were investigated in more detail. One of these schemes was found to be environmentally unacceptable and two economically less favourable. The investigations of the two most favourable schemes described below included assessments of the inundation, socio-economic and environmental impacts, and of the In-stream Flow Requirements and the Estuarine Freshwater Requirements:

The **Impendle Scheme** would comprise Impendle Dam on the Mkomazi River which would feed twin pipelines and a tunnel discharging into a stream upstream of Midmar Dam. The Midmar pump station, rising main and treatment works would be extended and also the pipeline and tunnel system to Umlaas Road (the Northern Feeder described previously).

The **Smithfield Scheme** would comprise the Smithfield Dam on the Mkomazi River and the Impendle Dam further upstream as a second phase. Water would be pumped from the Smithfield Dam via pipelines and a tunnel to discharge either into the existing Baynesfield Dam, which would be raised to provide balancing storage, and thence to a new water treatment works, or into a pipeline to a new water treatment works. From there the water would gravitate via twin additional pipelines to Umlaas Road.

Both these schemes would have high unit reference values with limited opportunity for phased construction.

Other possible options and considerations

The supply from the **Shongweni Dam** could be reinstated, however the dam's yield has been significantly reduced by siltation and the WTW has been dismantled.

Similarly the supply from the **Henley Dam** could be reinstated, however its yield has also been reduced by siltation, the WTW has been dismantled and the aqueducts sealed with concrete. Abstractions from this dam would reduce the yield of Inanda Dam.

On the other hand **Inanda Dam** appears to have surplus yield and consideration might be given to constructing a **new WTW on the northern bank of the Mgeni River** to temporarily or permanently feed the Inanda area via the proposed Western Aqueduct.

It has been suggested that a scheme on the **lower Mkomazi River** could supply water northwards along the coast using the new South Coast Bulk Pipeline.

The eThekwini MM favours **gravity schemes** or schemes with **lower pumping heads** on account of the high cost of electricity and the vulnerability to power outages.

Utilization of Waste Water

Vivendi operates eThekwini MM's Southern Waste Water Reclamation Plant (SWWRP). The supply of purified effluent water from this plant is fully utilized by industries and there is a market for any additional waste water that could be supplied. However the present treatment capacity of Vivendi's precipitation and tertiary biological system is limited by the volume of sewage delivered to the Southern Waste Water Treatment Works (SWTW) which can be treated to a standard acceptable for passing to the Reclamation Plant. The possibility of importing domestic effluent from the Amanzimtoti Waste Water Treatment Works (WWTW) for treatment at the Southern WWTW is under consideration but is opposed by local stakeholders on account of their view that this would cause additional odours.

It would appear to be feasible to treat effluent from other WWTWs to produce more effluent water for industrial use (possibly at Hammersdale). However there is a view that reclamation plant capacities of less than 20 Ml/day are not economic. If smaller plants are not economic then it might be possible to pump effluent from a number of smaller works to a large works similar to the SWWRP.

SAPPI/SAICCOR currently use 120 Ml/day of fresh water extracted from the Mkomazi River and are planning to construct an off-channel dam at Ngwadini to augment their supply. If SAPPI/SAICCOR could make use of purified effluent water then this could be exchanged for the fresh water they currently use which could then be supplied to Ugu DM and also reduce their demand on the Mgeni System. On the other hand SAPPI/SAICCOR may require water of higher quality for their processes, but this will need to be verified.

Umgeni Water is considering tertiary treatment of the effluent from their Darvill WWTW which treats all the sewerage from Msunduzi LM (Pietermaritzburg) and discharges this into the Msunduzi River, from where it flows into the Mgeni River and thence into the Inanda Dam. This option would provide additional water higher up in the catchment where it can be better utilized, but this would reduce the yield of the Inanda Dam, which is currently not fully utilized.

Desalination

In view of the potential difficulties associated with sewage quality, desalination of sea water may be a more viable option and may provide the option for incremental implementation.

1.3.4 Reserve

No comprehensive Reserve determinations have been undertaken for the Mgeni River and its tributaries. Earlier in-stream flow requirement studies were undertaken for the proposed Mkomazi Transfer Schemes and the Mooi-Mgeni transfer schemes, and the Reserve will be implemented on the Spring Grove Dam component of the latter and at Mearns.

1.3.5 Reconciliation of Requirements and Supplies

The WRPM results for the Mgeni System indicate that the risk of restrictions may already be unacceptably high and that even if the recent rate of growth in requirements reduces, by the time that Spring Grove Dam (MMTS-2A) and the upgrading of the Mearns pumping scheme (MMTS-2B) could be completed the requirements will have exceeded the supply. This is illustrated in **Figure 5**. It should be noted that the supplies shown in Figure 5 assume that the supplies from the Midmar, Albert Falls, Nagel and Inanda Dams are fully utilized whereas the Inanda Dam is currently not fully utilized on account of the location of the requirements relative to the dams and the existing bulk distribution infrastructure.

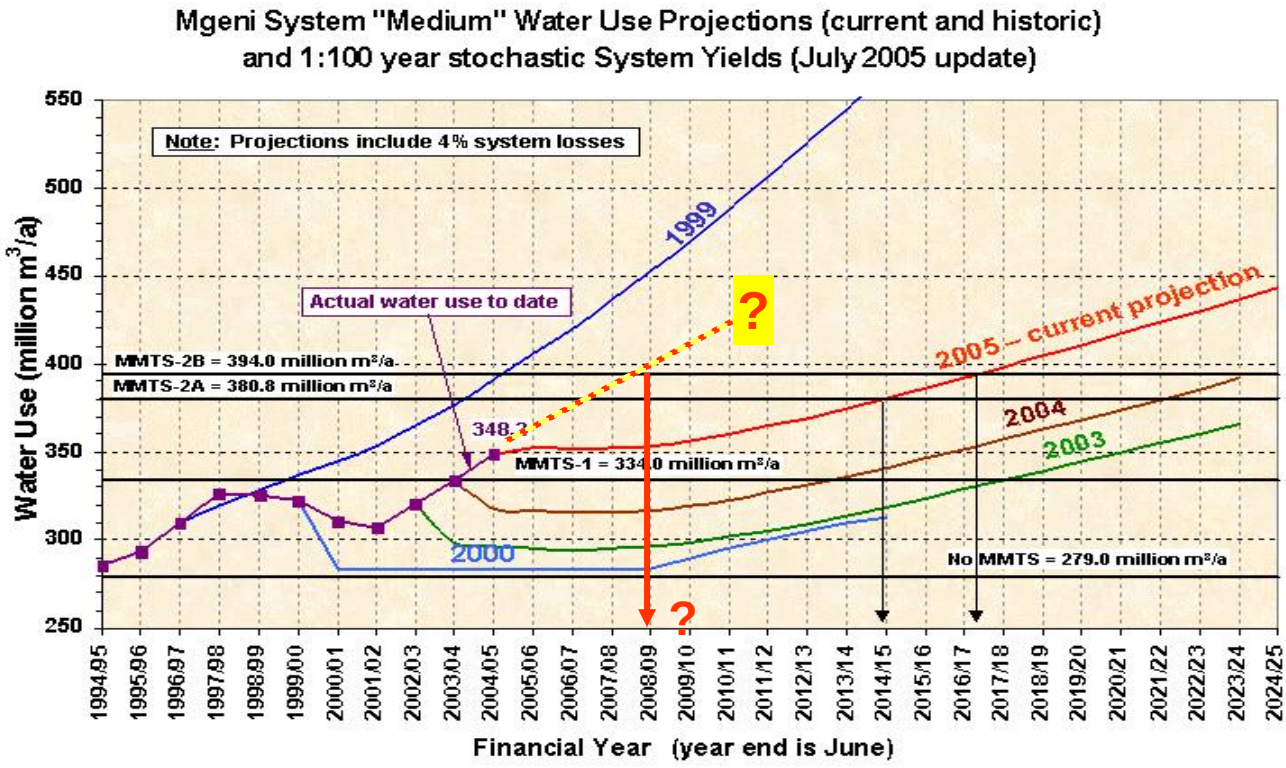

Figure 5. Requirements and yields of the Mgeni System

2. OBJECTIVES OF THE STUDY

The study outcome will be a Strategy to inform the early identification of resource development options to be studied further in order to meet water requirements up to 2030. The Strategy will not necessarily conclude with individual water resource option which will next be developed. It will rather identify potential groups of options which collectively form reconciliation scenarios, each of which could potentially be implemented. It will also identify the degree of information (and the time frames) required to give effect to the Strategy.

It is recognised that planning to meet future water requirements must be undertaken via a dynamic and iterative approach. Of the many parameters affecting future water requirement scenarios, some are easier to predict than others. Water resource planning cannot only rely on the benefit of hindsight, and as such the future water requirement scenario will have a range of potential permutations. The Strategy will need to be able to respond to actual water requirement scenarios and also take into account seasonal, short, medium and long-term variations in climate, which may ultimately differ from the best estimates initially made. In order to facilitate a dynamic Strategy, regular review, supported by monitoring, will need to be undertaken. The Strategy will be a living process, to be continuously improved as estimates of water requirements, water availability and resource development options become more reliably understood, during the 25-year planning horizon.

3. PURPOSE OF THIS TERMS OF REFERENCE

The purpose of these Terms of Reference is to provide a framework for the functions and responsibilities of the Study Team (ST) undertaking all aspects of the Assignment. The ST must provide the diverse skills and expertise required to undertake this assignment and within the time constraints.

4. GENERAL INFORMATION

4.1 Client and Study Name

The **Department of Water Affairs and Forestry** will act as the **Client** for the proposed assignment.

The assignment shall be called **Water Reconciliation Strategy Study for the Kwazulu Natal Coastal Metropolitan Areas**.

4.2 Relevant studies

The following is a list of studies that are relevant to this assignment. This list is not complete but will provide some guidance:

i). *DWAF (2005): National Water Resources Strategy.*

ii). *DWAF: Internal Strategic Perspective: Mvoti to Mzimkulu WMA (2004)*

iii). *DWAF: Internal Strategic Perspective: Usuthu to Mhlathuze WMA (2004)*.

iv). *DWAF: Internal Strategic Perspective: Thukela WMA (2004)*.

v). *DWAF: KwaZulu-Natal North Coast (Mdloti to Thukela) Water Conservation and Demand Management (WCDM) Assessment Study (2003).*

vi). *DWAF: Raising of Hazelmere Dam Feasibility Study (2003).*

vii). *Umgeni Water: Umgeni Water's Infrastrucure Plan 2004 (2004).*

viii). DWAF: Mvoti River Development Feasibility Study (1999).

ix). DWAF: Mvoti River Development Feasibility Study Extension (2000).

x). iLembe District Municipality: Mvoti Wellfield Study (2005).

xi). iLembe District Municipaliy: WSDP (2006/ ongoing).

xii). *DWAF: Mkomazi-Mgeni Transfer Scheme Pre-Feasibility Study (1999).*

xiii). *Umgeni Water: Umgeni Water's Feasibility Study*.

4.3 Level of detail

The assignment must be undertaken at a very high level of detail.

4.4 Joint Ventures

Joint ventures are allowed thus the firms on the shortlist may form an association or consortia with another PSP that might improve their capabilities on various components of the assignment.

4.5 Capacity-Building and Participation of HDIs and HDEs

The participation of HDIs (historically disadvantaged individuals) in the study is strongly recommended. The definition of an HDI follows that of the Department's current policy. A minimum HDI participation rate of 35% is required, in terms of expenditure on personnel supporting this contact. PSPs are encouraged to put forward HDIs as Key Personnel, as well as to form associations or joint ventures with HDEs. The Proposal must provide clear details about the nature of such collaborations and must be explicit about the following:

- HDI ownership percentage of each participating firm in associations or joint ventures formed for this study;
- the roles of HDIs in key personnel and technical support positions;
- the composition of HDEs that participate in associations or joint ventures formed for this study.

The ownership percentage for joint ventures or associations is calculated as a weighted average percentage based on the participation rate.

4.6 Execution, Supervision and Control

The ST will be appointed by the Department of Water Affairs and Forestry to carry out all the necessary work as described in the scope of services below including the day-to-day supervision and co-ordination of the successful conclusion of the study. The administrative and contractual matters of the project will be done by DWAF through a Project Manager, with assistance from the ST. The DWAF Project Manager will be the Chief Engineer: National Water Resource Planning East.

Provision must be made for the time and cost involved in co-ordination meetings. The ST will appoint specialists that may be required to render specialist services to the ST as part of this assignment after consultation with the DWAF Project Manager. The Client also reserves the right to second to the PSP one or more of his staff to work on the project.

The Project Manager will maintain strict control over the performance of the proposed activities, and payment will be dependent on acceptable progress. The Director: National Water Resource Planning shall certify invoices and a project progress sheet will be attached for his information. HDI involvement statistics will also be provided with each invoice. The reporting on HDI statistics must be in accordance with Departmental standards

5. SCOPE OF ASSIGNMENT

The assignment will be conducted in three phases, with Public Participation and Study Management being overarching tasks as described in the following sections:

5.1 Inception Phase
5.2 Preliminary Reconciliation Strategy (to meet water requirements up to 2012)
5.3 Final Reconciliation Strategy (to meet water requirements up to 2030)
5.4 Public Participation
5.5 Study Management

The format of the reports is described in Section 5.6 and the proposed study programme is outlined in Section 5.7.

5.1 Inception Phase

The tasks for the Inception Phase are as follows:

- Task 1.1 Assemble and Assimilate available Information
- Task 1.2 Prepare Inception Report

Task 1.1 Assemble and Assimilate Information

Methodology
The objective of this Task will be to assemble all available information on water requirements, resources and supplies for the existing North Coast supply area and the Mgeni System including the South Coast as far south as Scottburgh. This information should comprise:

- Existing water requirements for the urban/industrial and irrigation sectors including existing WCDM measures which are in place
- Future water requirement scenarios for the urban/industrial and irrigation sectors including existing WCDM measures, but excluding future WCDM measures
- Existing sources of supply and bulk distribution infrastructure
- Options for reducing requirements and augmenting supplies:
  - Further WCDM interventions in the urban and irrigation sectors
  - Surface and groundwater options
  - Waste water reuse
  - Desalination
- Reserve determinations and impacts of implementation
- Existing institutional responsibilities and co-operative governance including matters such as operating rules, infrastructure planning and development, tariff structures and monitoring.

- Existing public participation in the water sector

Information should be obtained from:
- Existing reports and documents
- Consultation with officials of DWAF, Umgeni Water and the various WSAs
- A visit to site

This information should be documented in a report.

Deliverables
The deliverables should comprise a report summarising the information assembled.

Task 1.2 Prepare Inception Report

Methodology
Utilising the knowledge gained through Task 1.1 prepare the Inception Report containing the following:

- Detailed descriptions of the study tasks to be undertaken
- Detailed budget including HDI participation
- Detailed Programme
- Organogram and Resources Schedule including HDI participation

Deliverables
Inception Report

5.2 Preliminary Reconciliation Strategy (to meet water requirements to 2012)

The Preliminary Reconciliation Strategy is required at a relatively early stage of the study in order to assist DWAF, the WSPs and the WSAs to select interventions to meet the potentially imminent shortfalls in water supply that are likely to be experienced by users of the Umgeni System and in the North Coast supply area. This Preliminary Strategy must select interventions to meet water the requirements to about **2012**.

The study tasks will be as follows:
- Task 2.1 Develop Short-Term Water Requirement Scenarios
- Task 2.2 Assess Interventions
- Task 2.3 Develop Short-Term Reconciliation Strategy
- Task 2.4 Report on Short-Term Reconciliation Strategy

Task 2.1 Develop Short-Term Water Requirement Scenarios

Objective
The purpose of this task will be to develop scenarios (low, medium and high) of future water requirements for the urban domestic and industrial and the irrigation sectors of the North Coast and Mgeni Systems up to about 2012. The limited time available for preparing these scenarios may preclude the utilization of the model to be developed under Task 3.1 below. If the model is

available then this should be utilized but if not, then it is suggested that the scenarios be based on data collected for the model still to be developed and other information as follows:

- Urban/industrial use:
    - Obtain from the WSP (Umgeni Water) and the WSAs (eThekwini MM, Msunduzi LM, uMgungundlovu DM, ILembe DM and Ugu DM) available information on urban domestic and industrial developments, and the historical bulk supply usages of the following: uMgungundlovu DM, Msunduzi LM, usage within the major supply zones of eThekwini MM, within ILembe DM and within Ugu DM as far south as Scottburgh.
    - Review IDPs and WSDPs regarding future developments and water requirements in the various localities.
    - Obtain and review previous water requirement projections by Umgeni Water, the WSAs and DWAF. DWAF's population projections were based on the 2001 census.
    - Prepare low, medium and high water requirement scenarios.
    - Convene a workshop with representatives of DWAF, the WSP's and WSA's to agree on the scenarios.
- Irrigation use:
    - Identify irrigation use from rivers and dams which impacts on existing supplies and would impact on potential future short-term reconciliation options (Task 2.2).
    - Obtain information from previous reports, DWAF's Regional Office and their WARMS data base about historical and present day irrigation use from dams, farm dams and rivers. Also consult any relevant Water User Associations (WUAs).
    - If necessary and feasible utilize historical aerial photographs or satellite imagery taken at various times to assess changing irrigation demands.
    - Assess the effects (up to about 2012) of potential future changes in land use on irrigation, taking developers' planning into account, including possible future golf estate developments.
    - Determine existing irrigation use and potential future use up to about 2012 (low, medium and high scenarios).
- Prepare chapters of report on future urban domestic and industrial use scenarios and future irrigation use scenarios.

Deliverables
Chapters of report (for Mgeni and North Coast systems) on existing and potential future urban domestic and industrial use and irrigation use up to 2012.

Task 2.2 Assess Interventions

Methodology
A suite of interventions must be selected and the actions necessary for their timely implementation identified so that these can be implemented in time to meet the requirements up to about 2012 as follows:

- Consult DWAF's RO, and the WSPs and WSAs to determine their plans and programmes for the implementation of interventions to augment the water supplies and to upgrade the bulk water supply infrastructure.
- Identify all potential interventions to reduce requirements (through WCDM) or to increase supplies, from reports, discussions with authorities and engineering judgement.
- In order to gain a full understanding of the potential benefits of both waste water reuse and the optimization of the combined total cost of water supply and waste water disposal, opportunities to augment water supplies should be integrated with the planning of future waste water infrastructure.

- Update or generate the following information about the interventions:
    - Time to implement including pre-feasibility and feasibility studies, EIAs, Reserve determinations, obtaining the necessary Records of Decision (RODs) and possible appeals, decision-making and budget requirements, design, tender, construction, reservoir filling etc.
    - Savings (through WCDM) or yield taking the Reserve into account for the recommended and existing river classifications.
    - Cost and URVs including the costs of additional bulk distribution infrastructure needed to implement the interventions (as identified with the assistance of Umgeni Water using their Visio model) as well as pumping, treatment, operation and maintenance costs.
    - Socio-economic and environmental impacts.
- Prepare chapters of reports on updated information.

Deliverables
Chapters of report (for Mgeni and North Coast systems) on updated information on interventions.

Task 2.3 Develop Short-Term Reconciliation Strategy

Methodology
Identify interventions that could be implemented to meet the water requirements until 2012 and workshop these with DWAF and selected WSPs and WSAs to choose options for implementation (or if options have already been selected, then review selection) as follows:

- Request Umgeni Water or DWAF to utilize their existing WRPMs of the Mgeni and Hazelmere Dam Systems to assess the risk and likely timing of restrictions based on the storage levels in the dams at the time and on the three water requirement scenarios for each system.
- Request Umgeni Water to utilize (or make available) their Visio model in order to compare the demands on the various dams, for the three future requirement scenarios, with the available supplies for various assurances of supply so as to assess where and when shortfalls are likely to arise.
- Utilise this information to select the most favourable interventions or groups of interventions (identified in Task 2.2) that could be implemented to meet the supply shortfalls for the various requirement scenarios until 2012.
- Workshop alternative interventions, or groups of interventions with DWAF, the WSPs and WSAs to agree on the most favourable interventions or groups of interventions to meet the requirements until about 2012. This date should also be agreed at the workshop.
- Prepare chapters of reports.

Deliverables
Chapters of report (for Mgeni and North Coast systems) on selection of interventions or groups of interventions to meet the various future water requirement scenarios until about 2012.

Task 2.4 Report on Short Term Reconciliation Strategy

Methodology
Integrate the findings of the above Tasks into one or more reports as deemed appropriate and prepare a layman-friendly executive summary (or summaries).

Deliverables
Integrated chapters of report (for the Mgeni and North Coast systems) and layman-friendly executive summaries.

5.3 Final Reconciliation Strategy (to meet the water requirements to 2030)

The Final Reconciliation Strategy is required to assist DWAF, the WSPs and the WSAs to determine future water requirement scenarios, and to identify or confirm the interventions that need to be investigated further, as well as the scope and the timing of these investigations. This should be facilitated by identifying the more appropriate sequences for interventions to be implemented to meet any of the future water requirement scenarios up to **2030**. The strategy should document the selection processes followed so that these can be reviewed and updated at regular intervals in the future. Other issues, such as those that might affect the efficient operation of the systems, information requirements for planning purposes, and co-operative governance should also be documented. The necessary actions to address these issues must be determined and the responsible authorities identified.

The study tasks will be as follows:

- Task 3.1 Develop Long-Term Water Requirement Scenarios
- Task 3.2 Assess Sequences of Intervention Implementation and Develop Final Reconciliation Strategy
- Task 3.3 Document Reconciliation Process
- Task 3.4 Other Issues and Concerns
- Task 3.5 Report on Final Reconciliation Strategy

Task 3.1 Develop Long-Term Water Requirement Scenarios

Objective
The purpose of this task will be to develop a model which will enable future water requirement scenarios (low, medium and high) to be determined for the urban domestic and industrial users of the North Coast and Mgeni Systems up to 2030. The model should account for the distribution of the bulk requirements supplied to: uMgungundlovu DM, Msunduzi LM, within the major supply zones of eThekwini MM, within ILembe DM and within Ugu DM as far south as Scottburgh. The model must be easily updated. Future irrigation requirement scenarios (low, medium and high) must also be determined, but no model is required.

- Urban/industrial use:
    - Utilise the information on existing urban domestic and industrial water requirements assembled for Task 2.1.
    - Develop a model (preferably spread-sheet based) to enable the prediction of future water requirements, taking the following factors into account: population and the various factors affecting its growth (e.g. birth and mortality rates, migration and HIV/AIDS), standard of housing, preferably based on stand values, social investment such as for housing, economic growth, major developments such as the Dube Trade Port or major industries, the distribution of bulk water supply infrastructure within the area (as described above) and any other factors that may affect requirements and their distribution.
    - Document the data requirements and the procedures for utilising the model, including a fully worked example for one of the scenarios developed.
    - Utilise the model to determine future water requirement scenarios up to 2030 (low, medium and high) utilising current day water requirements in the various supply areas as a starting point, i.e. including the savings of existing WCDM measures. Display these growth scenarios up to 2030 without taking account of any future WCDM measures.

- Irrigation use:
    - Utilise the information on existing irrigation water requirements assembled for Task 2.1.
    - Extend the Task 2.1 assessment of potential future changes in land use up to 2030.
    - Extend the Task 2.1 determination of potential future irrigation use up to 2030 (low, medium and high scenarios).
- Prepare chapters of report on future urban domestic and industrial use scenarios and future irrigation use scenarios.

This task will also provide a tool to assess how economic growth/decline affects the growth in water requirements in order to its affects in the model.

WCDM must be measured to understand any growth/decline in water demands i.e. one must be in a position to understand what its contribution is. This will help one to understand whether there are other factors present that influences water demands.

Recommendations are required with regard to the frequency required for updating water demands i.e. annually, 6 monthly, 2 yearly etc. e.g. in the last couple of years the demands were updated on a 6 monthly basis (approximately) and each time it illustrated how the urgency for augmenting the Mgeni system has become. This kind of approach is very important a couple of years before augmentation is needed but becomes less important once an augmentation scheme has been put in place that would support the system for a decade or more. The latter statement would not be true for current situation in the Mgeni system where the stress situation would remain even after the MMTS-2 (Spring Grove Dam and Transfer) has been implemented.

Deliverables

- Chapters of report (for Mgeni and North Coast systems) on existing and potential future urban domestic and industrial use and irrigation use up to 2030.
- The model for determining urban domestic and industrial water requirement scenarios including documentation and a worked example.

Task 3.2 Assess Sequence of Intervention Implementation and Develop Final Reconciliation Strategy

Methodology

Different sequences of intervention implementation to meet the various requirement scenarios (low, medium and high) up to 2030 must be selected and evaluated. This will enable the actions necessary for the timely implementation of interventions to be identified and prioritised.

- For the sub-tasks below, utilise the information on individual interventions assembled for Task 2.2, also taking account of any interventions already selected and implemented to meet the requirements up to about 2012.
- Identify all potentially favourable sequences for intervention implementation to meet the requirement scenarios and associated distributions within the supply areas up to 2030 as determined in Task 3.1.
- Request Umgeni Water to assist with the determination of their bulk infrastructure requirements and to utilise (or make available) their Visio model. The bulk infrastructure requirements should be determined for the various sequences of intervention implementation in order to supply the requirement scenarios and their geographic distributions. Estimate the capital and operating costs of the bulk infrastructure including opportunities for phasing.
- Utilise the cost estimates for the bulk infrastructure, as determined from the previous sub-task, together with those for the various interventions as determined in Task 2.2 to assess the URVs

and the financial unit costs of water (and waste water disposal where applicable) for the various sequences of intervention implementation, taking phasing into account.

- Workshop the alternative sequences of intervention implementation together with DWAF, the WSP and WSAs and agree on the more favourable sequences of intervention implementation to meet the requirements until 2030. The various factors to be taken into account in the selection process should be agreed at the workshop but are likely to include the following:
    - URVs and the financial unit costs of water (and waste water where applicable).
    - Timing for implementation and potential risk of delays.
    - The yields for alternative Reserve scenarios for rivers and estuaries.
    - Environmental and social impacts.
    - Water quality and pollution including the effects on treatment costs and potential health risks.
    - The advantages of storage and gravity supplies.
    - Electricity requirements and vulnerability to power failures and cost escalation.
- At the Workshop also agree which of the interventions should be investigated and when and what actions would be required, and who would be responsible.
- Prepare chapters of report.

Deliverables
Chapters of report (for Mgeni and North Coast systems) on the process and selection of intervention sequences for further investigation.

Task 3.3 Document Reconciliation Process

Methodology
The reconciliation processes described in Tasks 2.2, 3.1 and 3.2 should be fully documented. Any necessary monitoring systems to be put in place should be identified so that information and data can be assembled and the reconciliation process easily repeated at regular intervals, say every two years.

- Document reconciliation process including the following:
    - Use of the urban water requirements scenario model, its data needs for monitoring against scenarios and for updating.
    - Determination of existing and future irrigation requirement scenarios.
    - Information on interventions so as to improve reliability of estimated yields/savings, cost estimates etc for future interventions and sequences of intervention implementation.
    - The reconciliation process of selecting interventions and sequences of interventions to meet the requirement scenarios.
    - Monitoring requirements for data to be collected so that the process can be easily updated and repeated.
- Prepare report.

Deliverables
Chapters of report documenting reconciliation processes to be followed for the Mgeni and North Coast Systems.

Task 3.4 Other Issues and Concerns

Methodology
Other issues, such as those that might affect the efficient operation of the existing systems, information requirements for planning purposes, and co-operative governance should also be

developed through workshops with the WSP and WSAs. The necessary actions to address these issues must be determined and the responsible authorities identified.

- Convene a workshop with WSP and WSAs to develop a comprehensive list of additional issues that could affect the reconciliation process such as:
    - Rules and procedures for operating the dams such as maximizing gravity supply and minimizing pumping, minimizing spills, best water quality, assurances of supply.
    - Bulk distribution infrastructure constraints.
    - The need for integrating the planning of the treatment and disposal of waste water with the future planning of bulk water supply sources and infrastructure. Integrated planning should enable opportunities for waste water reuse to be maximized and for the combined total cost of water supply and of waste water infrastructure to be minimized.
    - Institutional arrangements that may constrain the optimal operation and planning of the water supply systems.
    - Tariff structures and the possible use thereof to encourage savings, the use of second class water, on-site treatment and re-use of waste water, and the optimal utilization of the water resources.
    - Procedures for the approval of new developments that may adversely affect bulk supply infrastructure, water quality or the optimal utilization of the water resources.
    - Insufficient monitoring or delays in processing of information on account of the lack of facilities and/or human resources.
    - Climate change.
- At the workshop group the issues, determine actions and assign responsibilities.

Deliverables
Chapter documenting issues, actions and responsibilities.

Task 3.5 Report on Final Reconciliation Strategy

Methodology
Integrate the chapters for the above tasks into one or more reports as deemed appropriate and prepare a layman-friendly executive summary.

Deliverables
Integrated Final Reconciliation Strategy Reports (for Mgeni and North Coast systems), layman-friendly executive summaries, and model for determining urban domestic and industrial water requirement scenarios including documentation and a worked example.

5.4 Public Participation

This Reconciliation Strategy will form an integral component of DWAF's planning of future water resources development for the Mgeni and North Coast Systems. Therefore public participation and input is essential in terms of NEMA, the Constitution and DWAF's Guidelines for Public Participation . This should take the form of public meetings and newsletters.

Methodology
The following processes are envisaged:
- Compile a stakeholder database from existing databases such as the Mzimvubu to Mvoti CMA Reference Group and stakeholders and Umgeni Water's various forums.
- Issue four newsletters:
    - At the commencement of the Preliminary Reconciliation Strategy

  - On completion of the Preliminary Reconciliation Strategy
  - During the Final Reconciliation Strategy
  - On completion of the Final Reconciliation Strategy
- Arrange three public meetings, and prepare presentations and minutes of meetings:
  - At the commencement of the Preliminary Reconciliation Strategy
  - On completion of the Preliminary Reconciliation Strategy
  - On completion of the Final Reconciliation Strategy
- Make presentations to the Mzimvubu to Mvoti CMA Reference Group on two occasions.

Deliverables
Chapter describing the Public Participation Process and including in Appendices four newsletters, the Power Point presentations and the minutes of the three public meetings and the presentations to the two CMA Reference Group meetings.

5.5 Study Management

Methodology
The study management will include the day-to-day administration of the contract, as normally required by DWAF's Directorate of National Water Resources Planning (D:NWRP) as well as technical co-ordination and financial management etc. The following are some of the sub-tasks:

- Liaise closely with DWAF D:NWRP Study Manager: Chief Engineer Water Resource Planning East and his deputy on a day to day basis as may be required.
- Arrange, prepare for, attend and minute 20 Study Technical Committee (STC) Meetings to be held at about monthly intervals, 10 in eThekwini MM and 10 in Msunduzi LM. 7 of these meetings will be held on the same day as the Study Steering Committee (SSC) Meetings. Membership of the STC is likely to include representatives of DWAF's D:NWRP and Regional Office (RO), Umgeni Water, eThekwini MM and possibly Msunduzi LM.
- Arrange, prepare progress reports for, attend and minute 7 SSC Meetings to be held at about quarterly intervals. Membership of the SCC is likely to include representatives of the STC, various other Directorates of DWAF, iLembe DM, uMgungundlovu DM, Ugu DM, the Provincial Departments of Local Government and of Agriculture and Environmental Affairs, and selected NGO representatives.
- Prepare budgets and financial reports on a monthly basis including the Percentage of HDI involvement.
- Co-ordinate the technical tasks of the study team members.

Deliverables
Minutes of STC and SCC Meetings, Quarterly Progress Reports, Monthly Budgets and Financial Reports.

5.6 Format of Reports

Separate reports or suites of reports shall be prepared for each of the three phases of the study (and possibly also for the Umgeni and North Coast Systems) as follows:

- One unbound and four bound copies of each report shall be provided.
- Four CDs each containing the full suite of reports in Portable Document Format (*.pdf)

- Four CDs each containing the following:
    - Full suite of reports in MSOffice format as described below.
    - Model for the determination of water requirement scenarios including documentation and a worked example.
    - GIS data.
    - Other supporting data

The text, spreadsheets, charts and programs making up the report should be prepared in a format compatible with Microsoft Office 97 or higher. Details pertaining to formats, fonts, title covers etc shall be finalised during the course of the Inception Phase. All data that have a spatial reference must be captured in ArcInfo GIS.

6. PROGRAMME

The proposed programme for the three phases of the study is as follows:

- Inception Phase 3 months (cumulative 3 months)
- Preliminary Reconciliation Strategy (to 2012) 6 months (cumulative 9 months)
- Final Reconciliation Strategy (to 2030) 9 months (cumulative 18 months)

Study Management will extend over the full 18 month period and Public Participation during the Preliminary and Final Reconciliation Strategy phases of the project.