

**Water Resource Planning
Systems Series**

Water Quality Planning

**WATER QUALITY
MANAGEMENT POLICIES
AND STRATEGIES FOR
SOUTH AFRICA**

Report Number 1.1

INCEPTION REPORT

DECEMBER 2015

EDITION 1



water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

Water Resource Planning Systems Series

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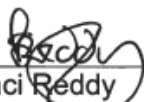
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LIST OF ACRONYMS

Abbreviation	Meaning
AMD	Acid Mine Drainage
BOD	Biological Oxygen Demand
CBS	Capacity Building Strategy
CFRI	Commercial Forestry Research Institute
CMA	Catchment Management Agency
CMF	Catchment Management Forum
CMS	Catchment Management Strategy
COD	Chemical Oxygen Demand
COGTA	Department of Cooperative Governance and Traditional Affairs
CoM	Chamber of Commerce
CSIR	Centre for Scientific and Industrial Research
DAFF	Department of Agriculture, Forestry and Fisheries
DEA	Department of Environmental Affairs
DMR	Department of Mineral Resources
DoE	Department of Energy
DPE	Department of Public Enterprises
DPRP	Danube Pollution Reduction Programme
DTI	Department of Trade and Industry
DWS	Department of Water and Sanitation
EDC	Endocrine Disrupting Chemicals
GDP	Gross Domestic Product
GEF	Global Environment Facility
HDI	Human Development Index
IWQM	Integrated Water Quality Management
M&E	Monitoring and Evaluation
MDG	Millennium Development Goals
NGO	Non-Government Organisation

NPS	Non-Point Source
NWA	National Water Act (Act 36 of 1998)
NWRS	National Water Resource Strategy
PAC	Project Administration Committee
PCT	Professional Counterpart Team
PMC	Project Management Committee
POP	Persistent Organic Pollutants
PSC	Project Steering Committee
RDM	Resource Directed Management
RSA	Republic of South Africa
SAIAE	South African Institution of Agricultural Engineers
SAICE	South African Institution of Civil Engineers
SALGA	South African local Government Association
SDG	Sustainable Development Goals
SWPN	Strategic Water Partners Network
TDS	Total Dissolved Solids
WDCS	Waste Discharge Charge System
WQM	Water Quality Management
WRM	Water Resource Management
WSA	Water Services Act (Act 108 of 1997)
WUA	Water User Association
WWF	World Wide Fund for Nature
WWTW	Waste Water Treatment Works

1. INTRODUCTION

It is recognised that the existing Water Quality Management (WQM) policy is dated (Water Quality Management Policies and Strategies in the RSA in 1991 and the Resource Directed Management of Water Quality in 2006) and whilst innovative at the time of publication, is now in need of revision in order to align with current overarching policy and legislative frameworks. Key amongst these issues is fundamental changes in governance and institutional frameworks and the need to consider more carefully the role of various public and private actors. It is also recognised that there is a range of supporting operational policies, strategies, management instruments and methodologies that have been developed and implemented in recent years. These provide a significant platform for the development of new strategies and policies, based upon the pragmatic experience of implementing these instruments.

It is clear that whilst WQM remains to be a core element of national water resource management policy, and is importantly reflected in the National Water Resource Strategy (NWRS) (Version 2), the resources and political emphasis that are directed towards WQM are not sufficient to support the necessary management regime. In the face of a developing economy, the need for a renewed approach towards WQM is critical if we are to manage the resources sustainably. In so doing it will be essential to develop policy, strategy and implementation actions that are relevant to addressing water quality deterioration that are pragmatic, implementable and appropriate to the future institutional and governance landscape. ***The engagement of public, private and civil society stakeholders in this process is essential and it is noted that the process to develop the policy, strategies and implementation actions is as important as the content of these various instruments. These engagements should not only create a sense of ownership of the revised WQM regimes, but should also create a new impetus towards improved WQM in South Africa.***

1.1 Purpose of this Report

A Request for Proposals was announced by the Department in May 2015. Pegasys, together with Aurecon and Write Connection, submitted a proposal on 18th June 2015, and the contract was awarded and signed on 4th October 2015. This Inception Report aims to clarify any issues that were highlighted during the Inception period and outline the:

- Key process steps and timeframes;
- Resource allocations;
- Expectations of the client in terms of deliverables;
- Issues for which the client will take responsibility; and
- Project management structures and reporting.

1.2 Development of the WQM Policy

Water quality is the term used to describe the physical, chemical, biological and aesthetic properties of water that determines its fitness for a variety of uses and for the protection of the health and integrity of aquatic ecosystems (DWAF, 1996).

The existing policy for the management of water quality from the perspective of the water resource, making it "resource directed" (DWAF, 2006), specifically focuses on measures to manage both the use and protection of the water quality component of surface watercourses, groundwater and estuaries. The policy does recognise that the specialised nature of WQM does require that this component of water resource management is addressed explicitly, but also notes the important linkages to water quantity and aquatic ecosystem integrity. The policy thus requires that water quality is not managed in isolation and to support this, it describes how water quality considerations should be integrated into water resource management.

With this in mind, the vision of the existing policy, as captured in the Resource Directed Management of Water Quality policy (DWAF, 2006) and the Ground Water Policy (DWAF, 2000), is to ensure that water is fit for its desired use. The vision also extends to ensure that an equitable and sustainable balance between the use and protection of water quality in water resources is achieved for the benefit of all South Africans.

Policy with regards to WQM has shifted in the last few decades, and this has been a construct of shifts in the political economy of the country. In making these paradigm shifts in the management of resources, policy needs to be appropriate for the current context, yet forward looking, considering aspects such as socio-economic development and the challenges of climate change. Clearly, policy needs to be aligned to the existing framework policy in the Department as well as broader government, and in so doing needs to carefully consider the need for vertical and horizontal integration between the various existing policy instruments.

Policy should also consider improvements in the understanding of the functioning of water resource types. Although the above broad vision for WQM applies across all water resource types, certain policy considerations may apply to specific water resources, due to their unique characteristics e.g. the Ground Water Policy (DWAF, 2000) specifically mentions that impacts on groundwater are often long-term and irreversible and that "the special nature of groundwater must be recognised when developing and implementing policy" and that as a key principle the "precautionary approach should be strictly applied when making decisions about groundwater". Other unique considerations may apply to e.g. non-perennial systems, wetlands and estuaries.

The complexities of the above are many and careful consideration of these will make for robust policy. Such issues include amongst others:

- Non-point source (NPS) and point source pollution;
- Source directed and resource directed measures;

- Regulatory systems and instruments as well as aspects of compliance monitoring and enforcement;
- Climate change, its potential impacts and adaptation strategies;
- Water-Energy-Food nexus and how this support growth and development;
- New water use activities such as the development of unconventional gas resources (this includes Hydraulic Fracturing, coal-bed methane extraction and underground coal gasification);
- Remediation (rehabilitation of wetlands);
- Integration and cooperative governance; and
- Protection and use of the resource.

It is important to note that the document, *Water Quality Management Policies and Strategies in the Republic of South Africa* (DWAF, 1991), was rooted in the existing context but was equally forward looking in its objectives towards integrated water resource management. As such, this policy strongly informed the 1997 White Paper as well as the 1998 National Water Act (Act 36 of 1998) (NWA). Hence, we do see in the existing approach to WQM both resource-directed and source-directed approaches. If we look to the key water quality concerns as reflected in this policy statement these were:

- Salinisation;
- Eutrophication;
- Micro-pollutants;
- Micro-biological pollutants; and
- Erosion and sedimentation.

These water quality challenges are still facing South Africa. It may be that in the current context these challenges would be prioritised differently, but nonetheless these water quality problems still exist. In light of this, it may be found that the project may only need to refine, revise, rework and refocus the existing policies. Alternatively, the policy approaches in the existing policy frameworks may not have been effective and, as such, need more than just revision. These considerations will be an important dimension of the process that takes us towards a policy that it is appropriate to the current South African context and that can support the countries continued and sustainable development.

A key factor to be aware of in developing new policy is not only the need to engage with key stakeholders external to the Department, but equally important will be the process to engage with internal Departmental stakeholders. It is crucial to identify the extent to which work is taking place in “silos” without formal procedures or mechanisms to ensure integration

between the different units. There needs to be sufficient allowance for these engagements. In addition, there also needs to be sufficient allowance for the policy approval process that will involve the senior management of the Department.

1.3 Development of the IWQM Strategy

The strategy becomes the route map to give effect to the WQM policy and must articulate the broader process of WQM, providing roles and responsibilities. It will be essential that the strategy outline the national approach to the differing dimensions of WQM and should include such aspects as compliance to water quality objectives; the management of thematic issues such as nutrient enrichment, salinisation and microbial contamination; regulation and regulatory instruments; monitoring; financial aspects; institutional and governance aspects; communications and capacity building. As with the policy, the strategy does need to be looking to the challenges of the future and should, therefore, articulate strategies to address arising issues such as (but not limited to):

- water quality off-setting;
- the use of buffer zones;
- the management of complex organic compounds; and
- institutional and governance shifts that will see the possibly increasing engagement of the private sector through Public-Private Partnerships.

The strategy does need to align with the NWRS II, and needs to consider other strategic documents such as the Waste Discharge Charge System (WDCS) strategy, the raw water pricing strategy, catchment management strategies (CMSs), and the various water reconciliation strategies.

It will be essential to structure the strategy in such a way that it is both comprehensive and engaging.

As with the development of the policy, sufficient time needs to be allowed for the senior management of DWS to engage with and approve this strategy. This has been a significant shortcoming of other strategic processes undertaken in the last few years, and the lessons from these processes show that there is a need to engage early, build capacity and provide sufficient supporting information and guidance to support management's approval of the strategy.

1.4 Recommendations for the Development of WQM Policies and Strategies for South Africa

A number of key aims and principles have been highlighted by various previous studies and discussions, which will need to be considered in the compilation of a revised WQM Policy and IWQM Strategy. This includes the following recommendations, which were highlighted at a WRC-hosted WAT-Indaba entitled "Preparing for an Integrated Water Quality Management Strategy for the SA Water Sector", held in February 2015:

- The policy and strategy should aim for alignment with fundamental principles of the NWA namely equity, sustainability, and efficiency in the beneficial use of the resource. It is understood that sometimes these principles are in conflict, and the strategy needs to make provision for conflict resolution.
- The policy and strategy should aim to integrate the needs of society, the economy and the bio-physical environment, it should integrate water quality and quantity, it should aim for integration across different water sectors and spatial and temporal scales, and it should aim to include all water users and relevant departments. In so doing, the policy and strategy should reflect the range of institutional arrangements and the associated management responsibilities.
- The policy and strategy should give attention to simplicity and pragmatism. The policy and strategy should recognise and explicitly make provision for different spatial scales including international, national, WMA and catchment, municipal and local scales. In noting these scales it is important to consider the challenges that emerge from differing institutional boundaries.
- The policy and strategy should use and promote the use of systemic thinking and methods, and the approach of adaptive management to enable sustainable management of water resources under changing socio-economic and climatic conditions.
- The approach to WQM should consider the importance of proactive planning in order to be prepared for the range of socio-economic and developmental requirements of the country. This supports a more informed understanding of the range of impacts and provides the opportunity to fully understand the management regimes required.

1.5 Converting Policy to Practice

In developing the implementation plans to put policy into practice, it is critical to align such plans with the range of planning instruments that exists in the Department. The plan needs to be pragmatic and very clear with regards to roles and responsibilities, resource (financial and human capacity) requirements and linkages and dependencies between key activities. Furthermore, key measures and indicators that are required to monitor and evaluate the

progress and effects of implementing the plan will form a key component for converting policy into practice.

In undertaking this process it is a natural progression to look at the organisational aspects of giving effect to the plan, and as such an analysis will be undertaken together with the development of the implementation plan that will result in recommendations regarding an enabling WQM organisational design. It is recognised that organisational change often touches on political sensitivities and, as such, this will need to be managed with care.

1.6 Stakeholder Engagements

It will be crucial to identify who and how the various stakeholders, and interested and affected parties will be engaged through the project to ensure that there is robust debate and a balance incorporated within the WQM Policy and the IWQM Strategy.

At this initial juncture, the team has identified differing levels of engagement:

- Information sharing and awareness;
- Data gathering and inputs;
- Consultation for consensus;
- To achieve buy-in and support;
- Capacity building;
- Identify issues and gaps; and
- Consider issues of cooperative governance.

Therefore, the engagements will take place in the following ways:

- Project Governance structures such as the Project Administrative Committee (PAC), Project Management Committee (PMC) and the Project Steering Committee (PSC);
- Other meetings and interviews;
- Focus groups (other national departments, sectors such as NGO's and the business sector, provincial departments, catchment management agencies, municipality, etc);
- Workshops (broader consultations);
- 9 Provincial workshops;
- 1 National WQM workshop; and
- 1 National WQM Symposium.

The exact details will be outlined in the Stakeholder Engagement and Communication Strategy and will be developed during the early stages of the project.

1.7 Communication, Administration and Liaison

The process includes administrative and liaison functions around project management, steering committee and stakeholder group meetings and supporting national workshops. Maintenance of a stakeholder comments register and minutes of meetings and workshops will be important.

The communication tools outlined as part of the project will require careful consideration and engagement with the Department in terms of format and effective roll-out.

2. STATUS QUO OF WATER QUALITY IN SOUTH AFRICA

2.1 Background to Water Quality

South Africa is a water stressed country and will, without suitable interventions, probably be facing water scarcity by 2025 (DWA, 2004). Increased stresses on the country's water are affecting quality, quantity and availability. The availability of water and its physical, chemical, and biological composition (collectively referred to as water quality), affect the various water uses with often direct impact on society and economy, as well as the ability of aquatic environments to sustain healthy ecosystems.

Water quality concerns that affect South African water bodies, include salinisation, sedimentation, nutrient enrichment and eutrophication, microbial contamination and urban runoff, toxic substances, endocrine disrupting substances (EDCs), pollutants of emerging concern, acid mine drainage, metal contamination, and radioactivity. In addition to this, and often forgotten, are the important aesthetic issues that also have socio-economic impacts. The impacts of these concerns are manifested at different scales ranging from national to water management area to sub-catchment to local scale. The scale of the impact often depends on the persistence of the pollutant in the aquatic environment, and the size and distribution of pollutant sources (cumulative impacts). Dissolved salts are regarded as conservative substances and concentrations are only changed by dilution or evaporation. Bacteria and nutrients are regarded as non-conservative substances such that in-river processes and uptake can reduce their concentrations. At a temporal resolution, three scales are relevant. Firstly, there are water quality concerns which occur year-round (these are usually associated with treated wastewater effluent discharges). Secondly, some concerns are seasonal (annual wet-dry cycle) and are usually associated with non-point sources and washoff processes. Lastly, some concerns are short-term event-related that are associated with either non-point sources (e.g. first-flush washoff of surface contaminants during heavy rainfall events), or point source-related (e.g. a mine tailings dam collapse or an accidental spill of contaminants into a water resource).

2.2 The Status of Water Quality Management in South Africa

Water quality management in South Africa has evolved over time and the Department has been working towards an Integrated Water Quality Management (IWQM) system for several years. Initially management was focused upon controlling pollution sources through general and special effluent standards. However, over time, there was a shift in focus to also include the receiving environment as the cumulative impacts of many effluent sources exceeded the assimilative capacity of receiving water bodies. Building upon the understanding of pollution control through effluent standards and managing the quality of the resource through receiving water quality objectives, the NWA introduced the concept of source directed controls and resources directed measures.

The heart of the challenge facing South African is finding an appropriate balance between protecting the water resources and using water resources for the economic and social upliftment of the country. One of the aims of the development of a WQM Policy and IWQM Strategy is to realise this balance between protection and use, and to ensure that impacts on the environment and the functions it performs is effectively remediated.

2.3 Key water quality concerns

In many areas, water quality is already on a downward trajectory and studies by the then Department of Water Affairs (DWA, 2010) and the Centre for Scientific Industrial Research (CSIR, 2010), amongst others, highlighted some of the challenges currently being faced. These are elaborated below.

2.3.1 Nutrient enrichment and eutrophication

Nutrient enrichment refers to the accumulation of plant nutrients in rivers and dams in excess of natural requirements resulting in nutrient enrichment or eutrophication which may impact on the composition and functioning of the natural aquatic biota (DEAT, 2000). The most essential nutrients required by plants are nitrogen and phosphorus in various forms (NO_2 , NO_3 , NH_4 , and PO_4). The direct impact is the excessive growth of algae and macrophytes (rooted and free-floating water plants) leading to impacts on recreation and sporting activities; the presence of toxic metabolites in blue-green algae (cyanobacteria); the presence of taste- and odour-causing compounds in treated drinking water, and difficulty in treating the water for potable and/or industrial use. In South Africa, nutrient enrichment is generally associated with water bodies that receive large volumes of treated wastewater, and agricultural runoff rich in fertilizer (DWA, 2010 and CSIR, 2010). In thermally stratified reservoirs interval loading of nutrients from the anoxic hypolimnion can also add substantial amounts of nutrients to the water column during autumn turnover. Many South African reservoirs show symptoms of eutrophication and even hypertrophic conditions (DWA, 2010; CSIR, 2010; Thornton *et al.*, 2013; Matthews and Bernard, 2015).

2.3.2 Acidification and Alkalinisation

The pH of natural waters is determined largely by geological and atmospheric influences. Freshwater resources in South Africa are relatively-well buffered. However, human-induced acidification, from industrial effluents, mine drainage and acid precipitation, can cause a lowering of the pH, leading to mobilisation of elements such as iron, sulphate, aluminium, cadmium, cobalt, copper, mercury, manganese, nickel, lead and zinc. This may impact the biota, as well as mining, domestic, industrial and agricultural users (corrosion of metal equipment and appliances). It can also cause unnatural colours in streams and rivers.

Of particular interest recently in SA has been the effects and management requirements for Acid Mine Drainage (AMD). Acid Mine Drainage refers to the outflow of acidic water which is generated by exposure of sulphide bearing minerals to oxygen and water during and after mining has taken place. In South Africa, AMD is generally associated with coal and gold mining activities (CSIR, 2010, DWA, 2010). In addition to the occurrence of AMD in the mining areas, acidic atmospheric deposition has also been shown to contribute to the acidification of water resources in the Highveld and eastern interior (Josipovic *et al.*, 2011).

Alkalinisation also appears to be an emerging water quality challenge in SA. A recent assessment by DWS indicated that, in general (i.e. at a national planning level), pH appears to be increasing and our rivers are becoming more alkaline (DWS, 2015). This could indicate potential side effects from activities such as current brine management, where neutralisation with lime is a common practice. The impact to surface water resources of such activities is not widely paid attention to and it was recommended that this phenomenon be investigated in more detail.

2.3.3 Salinisation

Salinity refers to the total dissolved inorganic compounds in the water and is measured as total dissolved solids (TDS) (DEAT, 2000). Salinisation refers to the increase in the amount of salts or dissolved solids in the water, as well as the accumulation of salts in soils, to the detriment of cultivated crops. It also refers to the build-up of salts in a river system to such a level that it poses a threat to the ecological integrity of the river and interferes with the desirable uses of the water. Human activities that contribute to salinity include the discharge of municipal and industrial effluent; irrigation return water; urban stormwater runoff; surface mobilisation of pollutants from mining and industrial operations and seepage from waste disposal sites, mining and industrial operations (Van Niekerk *et al.*, 2009). Atmospheric deposits (e.g. sulphate salts) have furthermore been shown to increase salt loads in rivers.

Effects of increased salinity in water resources include salinisation of irrigation soils and a reduction in crop yields; increased scale formation and corrosion in domestic and industrial water conveyance systems, increased requirement for pre-treatment of selected industrial water uses, and changes in the assemblages of aquatic biota. In South Africa there are three main sources of salts. The first is naturally saline soil which, if disturbed, leaches salts into surface water streams, the second source is irrigation return flows, and the third source is acid mine drainage and the discharge of industrial effluents. For example, river systems

such as the Breede, Olifants (both Mpumalanga and Western Cape), Orange and middle and lower Vaal system all show significant increasing longitudinal salinity gradients as a result of industrial and irrigation return flows (DWA, 2010, Van Niekerk *et al.*, 2009).

2.3.4 Urban Runoff

Urban runoff from dense settlements and overloaded sewage systems is the major source of deteriorating microbiological water quality (CSIR, 2010; DWA, 2010). A major concern that needs to be addressed is the ageing and leaking urban reticulation systems. Most waterborne pathogens occur in human or animal faeces and enter waterways via various pathways. Micro-organisms include protozoa (e.g. *Giardia* and *Cryptosporidium*), bacteria (e.g. *Escherichia coli*), bacterial infections (e.g. *Shigella*), viruses (e.g. Hepatitis) and helminths (parasitic worms). Urban stormwater runoff is also a major source of suspended sediment as well as heavy metals such as cadmium, chromium, manganese and iron, some of which are often particle bound. Urban runoff is also a major source of litter and solid waste, which includes micro-particles of plastic from clothing washing, in river and stream courses which has both aesthetic and habitat implications.

2.3.5 Erosion and Sedimentation

Sedimentation in the context of surface water conservation refers to the movement and deposition of soil particles and other organic materials. A large component of sediments found in surface water sources originate from soil erosion processes and wash-off and silt load carried by streams and rivers typically reflects the natural geophysical and hydrological characteristics of the upstream catchment. Many South African rivers carry a naturally high suspended solids load (DEAT, 2000; Gibson, *et al.*, 2010; CSIR, 2010; DWA, 2010). This has been further increased through construction activities; poor agriculture and silviculture practices; over-grazing; destruction of the riparian vegetation, and the physical disturbance of land by industry and urban development. High suspended-solids loads decrease light penetration of water; change natural productivity; affect the natural balance of predators and prey in biotic communities; smother habitats and organisms and change the viability of riverine vegetation. Additionally, high sediment loads are deposited in impoundments that change the nutrient cycling as compared to naturally produced sediment loads, thereby reducing their storage capacity over time.

2.4 Emerging and other water quality concerns

There are other water quality concerns that are recognised as being important in specific areas or that are regarded as emerging concerns (CSIR, 2010; DWA, 2010). These include:

- Partially metabolised pharmaceuticals and breakdown products of cosmetics;
- Nanoparticles used in the cosmetics and detergent industries;

- Radioactivity from mining activities;
- Agrochemicals, pesticide and herbicide residues, endocrine disrupting chemicals (EDCs), persistent organic pollutants (POPs), and toxic substances;
- Organic pollution (high Chemical and Biological Oxygen Demand (COD and BOD respectively) from poorly performing Waste Water treatment Works (WWTWs);
- Hydrocarbon pollution from parking lots, informal workshops, used oil disposal into stormwater drains;
- Invasive aquatic weeds and their impacts on water quality;
- Trace metal pollution from industrial sources and AMD;
- Thermal discharges from stratified reservoirs and industrial effluents, either warmer or colder than the receiving waters;
- Continued litter and solid waste in water courses from poorly serviced urban and peri-urban areas;
- Use of 'biodegradable, environmentally friendly' components which use up oxygen in the water. Large scale use may cause a large scale impact on water quality; and
- Increased water temperatures, caused by urban heat islands (where heated stormwater discharges into surface water resources), riparian vegetation removal and heated industrial discharges.

Climate change will exacerbate some of the water quality problems listed above. An increase in water temperature will likely have far-reaching effects on the quality of water in river and reservoir systems. For example, higher water temperatures will alter water-gas equilibria and increase the rates of microbial processes; these will in turn accelerate nitrification, denitrification, respiration and methanogenesis (the generation of methane by anaerobic bacteria).

There has been an increasing recognition of the challenges that South Africa faces in terms of its capacity to deal with the full range of Water Resource Management (WRM) concerns, of which WQM is one aspect. In thinking about capacity, one needs to move beyond the issues of staffing, skills, experience, and additionally consider issues of finance, systems, governance and institutional dimensions. At this juncture, it does appear that a more iterative approach to solving such challenges may be required. This will potentially require some form of prioritisation of the fundamental issues that will need to be addressed in a structured manner.

3. THE FIVE FUNDAMENTAL CHALLENGES WITH WATER QUALITY

The five primary water quality challenges outlined above all have multi-sectoral characteristics and speak to the overlapping or adjacent mandates of a range of government institutions. For that reason, it is believed that the requisite future management responses to these challenges will need to go well beyond the statutory and regulatory mandate, measures, controls, instruments and processes of DWS alone. The future management of these water quality challenges will need strategic regulatory collaboration and partnerships between DWS and various other state institutions across all three tiers of government, the Catchment Management Agencies (CMAs), water boards, the private sector and organised civil society. Therefore, in understanding these primary water quality challenges, it is useful to explore the drivers, the root causes and the cooperative governance and civic partnership considerations relevant to these challenges. This understanding starts to provide insights as to how the solutions required to improve WQM may be unlocked.

3.1 Nutrient Enrichment and Eutrophication

3.1.1 Primary Drivers

- Wide-spread discharge of raw or inadequately treated municipal sewage into the tributaries of the rivers that feed the dams. The 2013 Green Drop Analysis rated 49.7% of 824 municipal wastewater treatment facilities as “critical” or “poor”, as compared with 16.3% with ratings of “good” or “excellent” – the rest were rated as “average”.
- Raw sewage overflows into municipal stormwater systems due to blocked sewers. According to media reports this is a common occurrence in the more disadvantaged residential areas in many municipalities.
- Diffuse runoff and drainage from fertilized cultivated land under both irrigated and dry-land conditions. This phenomenon has been demonstrated and quantified in numerous scientific studies, both local and international.

3.1.2 Root Causes

- The root cause of municipal sewage discharges and overflows into surface water resources is a significant degree of dysfunction in many municipalities, implied by the 2013 Green Drop Analysis results. The dysfunction could manifest as any or all of the following shortcomings in the affected municipalities’ operations: inadequate financial and operational planning, inappropriate financial prioritisation, lack of pro-active infrastructure maintenance, inadequate problem reporting/response systems, lack of appropriate technical personnel, financial shortfalls, and so forth. Overarching this situation are inadequate cooperative governance and regulatory interfaces between DWS and the affected municipalities, the Department of Cooperative

Governance and Traditional Affairs (COGTA) and various other government institutions indicated in the table below.

- The root causes of diffuse nutrient loadings from cultivated land are inappropriate farming practices, such as over-fertilization, inappropriate tillage, over-irrigation, encroachment on or destruction of riparian buffer zones and wetlands, and so forth (Rossouw and Görgens, 2005; Lorentz, 2012; Cullis *et al.*, 2005). One of the root causes of this is that sewage treatment is perceived by some decision makers as a low priority. Inadequate cooperative governance and regulatory interfaces between DWS and the National Department of Agriculture, Forestry and Fisheries (DAFF) and its provincial counterparts and various other government institutions indicated in the table below hinders the management of these phenomena.
- Ineffective Enforcement by DWS of compliance to Standards as set in Licenses and General Authorisations.

3.1.3 Cooperative Governance/Partnership Considerations

Table 1: Partnership Considerations for eutrophication

DRIVER	REQUIRED COOPERATIVE GOVERNANCE & OTHER COLLABORATION PARTNERS FOR DWS
Municipal sewage discharges and overflows	Department of Cooperative Governance and Traditional Affairs (COGTA); Department of Human Settlements; Department of Health; National Treasury; Water Boards; CMAs; South African Local Government Association (SALGA); the South African Institution of Civil Engineers (SAICE), etc.
Diffuse nutrient loadings from cultivated land	National Department of Agriculture, Forestry and Fisheries (DAFF); Provincial Departments of Agriculture; CMAs; Organised Agriculture; National Department of Environment Affairs (DEA); Provincial Departments of Environment Affairs; Land care organisations.

3.2 Acidification and Alkalinisation

3.2.1 Primary Drivers

- Discharge into surface waters from abandoned mine shafts of groundwater acidified by long-term continuous contact with acidifying geological strata, such as coal exposed by mining.
- Contaminated seepage, leaching, runoff and spills in relation to waste-rock dumps, open cast excavations, stock piles, combustion fly-ash dumps, landfill, effluent irrigation, pollution control dams, pipelines, evaporation ponds and slimes dams.

- Washoff and leaching of widespread acidic atmospheric deposits from Highveld and neighbouring catchment surfaces stemming from smoke-stack emissions at power stations.

3.2.2 Root Causes

- The root cause of water resource acidification due to acid mine drainage is a historical and recent lack of precautionary planning, regulation and enforcement by the relevant authorities, and of ring-fenced rehabilitation financing for the necessary rehabilitation by the relevant mining companies.
- The root causes of contamination of water resources by heavy metals and related acidification are any of the following: lack of compliance by mines and thermal power stations of their licence conditions; lack of or inappropriate licence conditions; lack of monitoring and reporting of their own pollution loads; inadequate enforcement capacity in the national and provincial Environment Affairs departments and DWS; and inadequate cooperative governance and regulatory interfaces between the Department of Mineral Resources (DMR), the National Energy Regulator, DEA and DWS and the promoters of economic activity such as the Department of Energy (DoE), Department of Public Enterprise (DPE) and Department of Trade and Industry (DTI).
- There is no clear way of obtaining a closure certificates, and therefore some mines opt not to comply.
- The lack of provincial strategies to deal with the effect of multiple mines (and mining houses) also makes it difficult to ensure adequate protection of water resources.
- There seems to be a lack of adequate clarity regarding roles and responsibilities within DWS (e.g. the Directorate: Resource Protection and Waste has a mining section; there is also a Mine Water Management Unit that has been established to deal with mining). In addition, the procedures of rehabilitating abandoned and ownerless mines has not been reviewed recently and it unclear as to who will lead this and if there is capacity within the Department to take this on.
- The root cause of acidic atmospheric deposits includes inappropriate atmospheric emission licence conditions for Eskom's power stations and other industries with large emissions; a lack of understanding of the current pollution loads and their effects on SA's water resources, lack of monitoring and accurate reporting of pollution loads; lack of enforcement; and inadequate cooperative governance and regulatory interfaces between the water-energy-air role-players such as Eskom, the National Energy Regulator, DEA, DWS, DoE and DPE.
- Flue-gas desulfurization to remove sulphur dioxide from exhaust flue gases is not yet enforced in South Africa, noting that it is an expensive technology and will require water, which is challenging in a water scarce country.

3.2.3 Cooperative Governance/Partnership Considerations

Table 2: Partnership Considerations for acidification, heavy metal contamination and acid mine drainage

DRIVER	REQUIRED COOPERATIVE GOVERNANCE & OTHER COLLABORATION PARTNERS FOR DWS
Acid mine drainage	DMR, DEA, National Treasury, CMAs; Chamber of Mines, etc.
Contamination by heavy metals and related acidification	DMR, National Energy Regulator, DEA; Provincial Departments of Environment Affairs; CMAs; Chamber of Mines, etc.
Acidic atmospheric deposits	Eskom; National Energy Regulator; DEA; Provincial Departments of Environment Affairs, CMAs, etc.

3.3 Salinisation

3.3.1 Primary Drivers

- Diffuse drainage and washoff of rainfall-mobilised natural in-situ salts in soils and in the underlying geological strata that have been disturbed by dry-land cultivation.
- Diffuse sub-surface irrigation return flows rendered saline by the concentrating effect of the consumptive use of irrigation water by crops, as well as mobilisation of natural in-situ salts along the return flow drainage paths.
- Mine water (including AMD) and Industrial discharges.
- Atmospheric deposits.

3.3.2 Root Causes

- The root causes of salinisation due to crop cultivation activities are inappropriate farming practices, such as inappropriate dry-land tillage, inappropriate dry-land crops, over-irrigation, inappropriate irrigation technology, lack of intercepting drainage and related evaporation pond infrastructure, inappropriate irrigation water conveyance practices, and so forth.
- Overarching this situation are inadequate cooperative governance and regulatory interfaces between DWS and DAFF, its provincial counterparts, other agricultural bodies and various other government institutions indicated in the table below.
- The root causes of acid mine drainage and acidic atmospheric deposits are outlined in Section 3.2 above.

3.3.3 Cooperative Governance/Partnership Considerations

Table 3: Partnership Considerations for salinisation

DRIVER	REQUIRED COOPERATIVE GOVERNANCE & OTHER COLLABORATION PARTNERS FOR DWS
Diffuse salinisation related to crop cultivation	DAFF; Provincial Departments of Agriculture; CMAs; Organised Agriculture; the South African Institution of Agricultural Engineers (SAIAE), etc.
Salinisation due to acid mine drainage and acidic atmospheric deposits	Outlined in Section 3.2 above.

3.4 Urban Runoff

3.4.1 Primary Drivers

- Stormwater runoff from formalised pervious and impervious urban areas or sewer overflows into stormwater conduits and industrial activities that are linked to the urban wastewater systems: contaminants include hydrocarbons, nutrients; metals; organics; inorganic salts; pathogens and litter.
- Stormwater runoff from less-formalised dense peri-urban or rural human settlements, including direct disposal of effluent or waste into the resource: contaminants include nutrients; organics; pathogens and litter. Common effluents and wastes include domestic refuse, grey water, seepage from latrines and human and animal excrement.

3.4.2 Root Causes

- The root causes of excessive water pollution from both formalised urban areas and other less-formalised dense human settlements are many and vary from context to context. The causes are often the lack of or inappropriate infrastructure, inadequate financial and operational planning, inappropriate financial prioritisation, inadequate problem reporting/response systems, lack of pro-active infrastructure maintenance, lack of appropriate technical personnel, financial shortfalls, conversion of surface water systems into stormwater conduit systems, canalisation of rivers and streams, no long term planning in terms of the rainfall and flooding cycles and so forth.
- As with other issues, inadequate cooperative governance and regulatory interfaces between the affected municipalities, DWS, Department of Cooperative Governance and Traditional Affairs (COGTA) and various other government institutions further

exacerbate the above-mentioned causes. These institutions are indicated in the table below.

3.4.3 Cooperative Governance/Partnership Considerations

Table 4: Partnership Considerations for urban runoff

DRIVER	REQUIRED COOPERATIVE GOVERNANCE & OTHER COLLABORATION PARTNERS FOR DWS
Stormwater runoff from formalised urban areas	Department of Cooperative Governance and Traditional Affairs (COGTA); and National Treasury; SALGA; the South African Institution of Civil Engineers (SAICE), etc.
Stormwater runoff from less-formalised human settlements	Department of Cooperative Governance and Traditional Affairs (COGTA); Department of Human Settlements; Department of Health; National Treasury; SALGA; the South African Institution of Civil Engineers (SAICE), etc.

3.5 Erosion and Sedimentation

3.5.1 Primary Drivers

- Anthropogenically-driven erosion of surface soils of catchments and of stream/river banks. This is exacerbated by poor land management activities where soils are erodible by various riparian and in-stream activities.

3.5.2 Root Causes

- The root anthropogenic causes of sedimentation due to erosion are the following: inappropriate crop cultivation and silviculture practices; careless construction activities; over-grazing; destruction or encroachment of riparian vegetation buffer zones; destruction or encroachment of wetlands; physical modification of river channels and banks; excessively dense less-formalised human settlements; with no proper management of stormwater; and stormwater mismanagement, amongst others.
- Overarching this situation are inadequate cooperative governance and regulatory interfaces between DWS and DAFF and its provincial counterparts, DEA and its provincial counterparts, and various other government institutions indicated in the table below.

3.5.3 Cooperative Governance/Partnership Considerations

Table 5: Partnership Considerations for sedimentation

DRIVER	REQUIRED COOPERATIVE GOVERNANCE & OTHER COLLABORATION PARTNERS FOR DWS
Sedimentation due to anthropogenic causes of erosion	DAFF; Provincial Departments of Agriculture; DEA; Provincial Departments of Environmental Affairs; CMAs; Organised Agriculture; the South African Institution of Agricultural Engineers (SAIAE); the South African Institution of Civil Engineers (SAICE); Commercial Forestry Research Institute (CFRI); SALGA; Land care organisations, etc.

3.6 Implications of these Considerations

- Strategic management of the primary water quality challenges will require a ***drastic intensification of cooperative governance and regulatory interfaces*** among the various affected government entities.
- In order ***to fully understand the above intra-government institutional challenges*** and to be able to derive ways to address such institutional challenges, ***engagement with appropriate decision-making representatives*** of the affected government entities will be crucially important.
- Such intra-government engagements will require the ***approval of the Directors-General of DWS and the affected departments***, as well as of the Accounting Officers of other government entities.
- This ***intra-government engagement will need to include National Treasury*** because some of the potential strategies to deal with dysfunctional municipalities' poor wastewater plant operations and maintenance, as well as with historically-caused acid mine drainage, might require special public financing arrangements.
- Additional to the above intra-government engagements, a strategic management approach to the primary water quality challenges will require that ***DWS will also need to forge highly-focused, fit-for-purpose, civil society and corporate business partnerships*** that are respectively relevant to each primary water quality challenge.
- Regulation and prohibition of protected areas as per the NWA.

4. THE CLIMATE CHANGE LENS ON WATER QUALITY

It is abundantly clear that climate change poses a major threat to South Africa and the world as a result of increased temperatures, changes in rainfall and extreme weather. General Circulation Model downscaling for the Long Term Adaptation Scenarios (LTAS) showed that across South Africa, surface air temperature shows a general warming everywhere, but most strongly in the interior (DEA, 2013). Coastal warming is expected to be around 1°C increasing to around 3°C in the northern interior by the middle of the current century. By the end of the century warming is expected to be even greater, depending on the level of future greenhouse gas emissions.

Future rainfall patterns in South Africa under climate change are highly uncertain. While many of the models reflect the trend of wetting in the eastern parts and some drying in the west of the country, some models predict a strong drying trend across the country. This has an important implication for the climate change predictions by shifting the envelope of possible climate futures to include a much dryer future across the country. Even with the uncertainty, all water resource management strategies must consider a much more challenging climate scenario in order to be better prepared for a broader range of potential climate outcomes.

There has been significant work done at a national level on the development of the Climate Change White Paper and associated mitigation and adaptation strategies and scenarios. An effort to develop a National Adaptation Strategy for the entire country is currently underway, and several sectors have developed or are currently developing sectoral adaptation strategies, including for water, agriculture, health, rural development, human settlements and urban heat islands, using urban water courses as stormwater infrastructure.

The effect of Climate Change on water quality is driven by a number of inter-linked factors. Increased temperature in the short-term will result in an increase in water temperatures causing stress and affecting the physiology of aquatic life. The higher water temperatures could also result in decreased oxygen levels, changes in the rates of chemical and biological reactions, increased algal blooms as well as potential changes in species. Increased rates of evaporation coupled with shifts in the timing and quantity of rainfall would result in changes in the timing of high/ low runoff flows, increased incidences of flooding and flash floods would increase instances of erosion, which can in turn affect the nutrient status of a resource. Droughts can increase the concentration of salts and other constituents in the water, which can result in hypersaline and toxic events.

Climate change can also be expected to influence the outbreak and prevalence of water borne diseases. Poor water and sanitation infrastructure in South Africa may not be able to cope with increased pathogen loads, which may emerge from increased water temperatures as well as from the increased urbanisation that we can expect as resources become constrained. Aging water treatment and distribution systems are particularly susceptible to heavy rainfall. Temperature influences the life cycles of infectious agents and their vectors and reservoirs (Semenza and Menn, 2009). The former scenario increases the likelihood of

water supply contamination due to the risk of sewer overflows, whilst the latter leads to an increase in the percentage of sewage effluent in rivers and/or by increasing risk of groundwater contamination when the water table drops (Moors *et al.*, 2012).

Consequently, a ***climate change lens is necessary for the development of a robust water quality management policy, strategy and implementation plan.***

5. WINDOWS OF OPPORTUNITY

5.1 Sustainable Development Goals

The turn of the century saw the deadline for the Millennium Development Goals (MDGs) pass. These goals were extremely ambitious and took on a timeframe of 15 years from the year 2000. It appears that the world was not geared to achieve these goals in the timeframe set, seeing that 15 years have now passed. The MDGs, however, paved the way for the Sustainable Development Goals (SDGs), which continue the ethos of the MDGs and has expanded from 8 goals to 17 (UNDP, 2015), as can be seen in the figure below.



Figure 1: Sustainable Development Goals

[Source: <https://sustainabledevelopment.un.org/?menu=1300>]

The SDGs provide an opportunity for South Africa to critically think through the targets for the country and link to these broader processes. Of key interest is Goal 6, with the following specific targets:

- By 2030, achieve universal and equitable access to safe and affordable drinking water for all
- By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations
- **By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally**
- By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity
- **By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate**
- **By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes**
- **By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies**
- Support and strengthen the participation of local communities in improving water and sanitation management

All socio-economic and development sectors are affected by water quality challenges and can benefit from implementing SDG 6, leading to advances in water efficiency and resources management, pollution reduction, and ecosystem protection. In essence, whilst Goal 6 speaks to clean water and sanitation, water quality management is a central element in achieving most of the other SDGs:

- **Goal 1:** no poverty –access to good water quality provides a crucial step in poverty alleviation.
- **Goal 2:** no hunger - good water quality is required for the agricultural sector which is responsible for food production.
- **Goal 3:** good health –once again, good water quality is pivotal to ensuring the promotion and sustainment of good health.
- **Goal 5:** Gender equality by allowing access to jobs in the water, planning, engineering sectors etc. in water management.
- **Goal 8:** good jobs and economic growth is dependent on good water resource management to support the various economic sectors such as mining, agriculture and fisheries, to name a few.

- **Goal 14:** life below water speaks to the health of our aquatic systems, which is fundamentally dependant on certain water quality requirements and is affected by changes in water quality.

The above points place in context the significance of good water quality as the foundation for achieving the SDGs and further drives home the need for an integrated water quality management policy and strategy for this country.

In developing the policy, strategy and implementation plans for this project, alignment with the SDGs will be considered, amongst other international policies and strategies. This provides a useful catalyst at an international level for potential shifts in approach.

5.2 The Green Economy

Noting the range of resource stresses that are being faced by economies around the world, there is a global appetite for approaches that result in reduced environmental risks and ecological scarcities, and that aim for sustainable development without degrading the environment. This recognises the value of green infrastructure (also known as ecological infrastructure) as part of creating resilient economies. There is an increasing awareness of the goods and services that green infrastructure provides and importantly there is recognition of the key role this plays in managing water quality. South Africa currently has a number of dedicated legal and policy tools for the management of biodiversity, ecological infrastructure and ecosystem services and recognises the necessity to protect these from encroaching agricultural, urban, industrial and mining activities.

In addressing the green economy itself, there is an economic opportunity to set up industries and industrial bases that reduced a range of environmental risks. Germany is at the forefront of this.

❖ Opportunities for the development and growth of the green economy

- While the scale of Germany's economy and its ambitious energy transformation programme are not suitable for the South African context, Germany nevertheless offers lessons on how to incentivise and support the growth of its green industry. It also stands testament to the ultimate profitability and productivity of green industries and economies. Germany has taken measures to capitalise on its green industrial economy through research and development support, energy and climate funds, tax breaks and subsidies. With directed investment and enabling policies, South Africa could also capitalise on such approaches that support the development of the green economy whilst ensuring that its green infrastructure is conserved to assist in the management of water quality as part of an integrated strategy.

5.3 Shift to Stewardships and Partnerships

Inadequate natural resources, particularly water resources, have led to increasing private sector concern over the attainment of development imperatives as specified by the sustainable development goals. This has resulted in an exploration of “new era” partnerships that are based on the concept of shared value. These partnerships are an emerging trend in which the private sector provides support to the public sector in achieving its development goals and basic service provision imperatives. Although sometimes with mixed results, the aim is to improve efficiency and/or provide basic services to civil society, either through financing, implementing interventions, and/or performing strategic or capacitating functions.

Increasingly, the private sector is being recognised as a key actor in supporting the efforts of water resource management and improving access to water resources. This is particularly important as partnerships allow the attainment of objectives through efforts that could not be easily achieved by the private or public sector independently. Partnerships with the private sector thus have the potential to achieve highly ambitious sustainable development goals, especially adequate access to good quality water resources which is a basic human right.

The establishment of ‘Type II’ partnerships, through the inclusion and engagement of the private sector and civil society in water resources management is a new development globally. Due to the infancy of these forms of partnerships, there remains some uncertainty as to how they are established and run. The success of these partnerships does however hinge on the functioning of the governance and management aspects of the partnership and individual institutions themselves. In addition, appropriate funding and investment decisions supported by functioning institutional arrangements will enable the success of these solutions.

There are a few of these types of partnerships that exist in South Africa. This includes the National Business and Biodiversity Network or NBBN (a partnership between businesses and the DEA) and the Strategic Water Partners Network (SWPN). Through the initiative of the SWPN, there is now for example, an opportunity to solve the water quality challenge in the Olifants Catchment through the establishment of a Mine Water Coordinating Body. ***Joint action by all relevant role-players will allow for an optimal solution***, as well as coherent and integrated catchment-wide water resource management.

❖ Cost effective and community driven treatment

- The Naandi Foundation, an Indian based non-governmental organisation, was founded in 2006. It uses public-private partnerships to create sustainable development initiatives for delivering essential services, such as safe and clean drinking water, to poor communities. Naandi, together with Water Health India (WHI), a disinfection technology provider that is a subsidiary of Water Health International (WHI), approached Global Partnership on Output-Based Aid (GPOBA) to request funding to pilot rural village water schemes in coastal Andhra

Pradesh that combined cost-effective water purification technology with a community-driven and performance-based approach. The partnership combines cost-effective water purification technology with a community-driven and performance-based approach for drinking water treatment and provision. The output-based approach requires that tariffs be paid by users for consumption to cover the costs of operation and maintenance, user-fee collection, and education and communication activities with key stakeholders and vulnerable groups. As of 2010, Naandi had 300 plants serving safe drinking water to 393,000 households.

❖ **Stewardship for improved water management in the Indus**

- WWF-Pakistan introduced the concept of water stewardship in Pakistan in order to reduce the impacts of increased water use and water pollution on the Indus Basin, while meeting the needs of businesses and agricultural development. WWF-Pakistan not only aims at reducing the water footprints but also urges business and companies to look beyond their own operations, so as to advocate, support and promote better basin governance for sustainable water resource management. In this regard, WWF-Pakistan has worked closely with industries from textile, paper and pulp, sugar and leather sectors to make a business case in water conservation by reducing water consumption and pollution. Additionally, WWF-Pakistan is working with the corporate sector for the implementation of Alliance for Water Stewardship (AWS) standards to support businesses in improving their water management within their premises and along their supply chains. In addition to “within the fence-line” improvements, WWF-Pakistan strives to work hand-in-hand with businesses, academia and the government to engage policymakers and institutions on delivering sustainable management of the Indus Basin. In this context, WWF-Pakistan has established a multi-stakeholder city-wide water stewardship partnership, comprising industries, public authorities, supporting institutions and multi-national companies. WWF-Pakistan is also working at community-level to improve access to safe water through water management interventions. Such an approach is also being investigated by WWF-SA for use in the protection of SA's Strategic Water Source Areas.

The nature of these types of partnerships to manage, finance and implement also leads to a critical conversation about how to deliver more effectively and in a more collaborative manner. Most importantly, efforts should be made to recognize existing alliances and build upon them for sustainable development in the water and sanitation sector (UN Water, 2015).

5.4 Re-looking at Financing Mechanisms

There is a range of alternative and innovative financing mechanisms available that provide opportunities to support improved WQM. Finances and funds from such sources as the International Climate Fund, the Green Fund, the financial provisions made by the mining industry, pollution charges and WRM charges can all contribute. Mechanisms to improve or facilitate such contributions would include e.g. the review and establishment of regulations such as the recent (November 2014) proposed regulations by the DEA for financial provisions for rehabilitation, closure and post closure of prospecting, exploration, mining or production operations.

Consideration of these funding alternatives, and the management possibilities that they can support, will be a key dimension of policy, strategy and implementation planning.

❖ Innovative municipal funding

- The impact that ailing municipal infrastructure and its poor management is having upon water resources; may provide an opportunity to have discussions with National Treasury regarding more innovative approaches to municipal funding. These discussions could go beyond just financing the required infrastructure maintenance and upgrades, but looking towards innovations such as transforming treatment facilities into suppliers of energy, and so forth.

❖ Waste Discharge Charge System

- The Department is still in the process of piloting the Waste Discharge Charge System (WDCS) that provides an economic instrument to support the management of water quality. There are associated charges; the Waste Mitigation Charge, which will be collected and managed, by the CMA or proto-CMA and the Waste Discharge Levy, which is a tax that will contribute to the national fiscus. This Waste Discharge Levy provides an opportunity to engage National Treasury on ring-fencing those funds for use on specific water quality issues, either in the catchment or in other parts of the country. The WDCS is seen as part of an integrated solution to WQM in the country.

❖ Opportunities for improved mine closure

- Opportunities exist in improving the management of the impacts of the mining sector through clarifying the use of the mine closure fund.
- The National Environmental Management Laws Amendment Bill 2015 has been published for comment. Among other things, it amends the NEMA of 1998 to:

- **Provide clarity to the definition of “financial provision”** that an applicant or holder of an environmental authorisation relating to mining activities must set aside financial provision for progressive mitigation, mine closure and the management of post closure environmental impacts.
- Currently there is still some confusion around the custodianship of the fund and if the funds are being used effectively.
- A major concern currently is the looming drought that is gripping the country and which will have WQM ramifications. However, this also provides opportunities for access to alternative avenues of funding and financing such as disaster management funds that can assist in the overall management of water quality.

Overall, there are a number of discussions to be had to ensure that there is an integrated approach to directly and indirectly financing/funding water quality management.

5.5 Restoration and Rehabilitation of Catchments

Best practice dictates that water should be managed at a basin/catchment level, rather than according to provincial, administrative and political boundaries. This ensures that optimal solutions at catchment scale are explored. Importantly, it is also recognised that some decisions in terms of water resource management need to be taken at national and even international levels. In so doing, the national and international implications start to become evident and a greater understanding of where resource directed as well as socio-economic trade-offs should be considered is obtained.

Countries are starting to realise that it is critically important to restore and rehabilitate catchments in order to improve environmental functioning and improve resilience. These programmes are also important in galvanising social and corporate support for iconic environmental issues.

According to the WWF, in developing a strategic plan for catchment restoration a combination of gray and green solutions should be used. In the figure below the benefits of restoring and using green infrastructure in combination with the gray options (i.e. traditional infrastructure) for the greater benefit of the downstream communities/ stakeholders is highlighted.

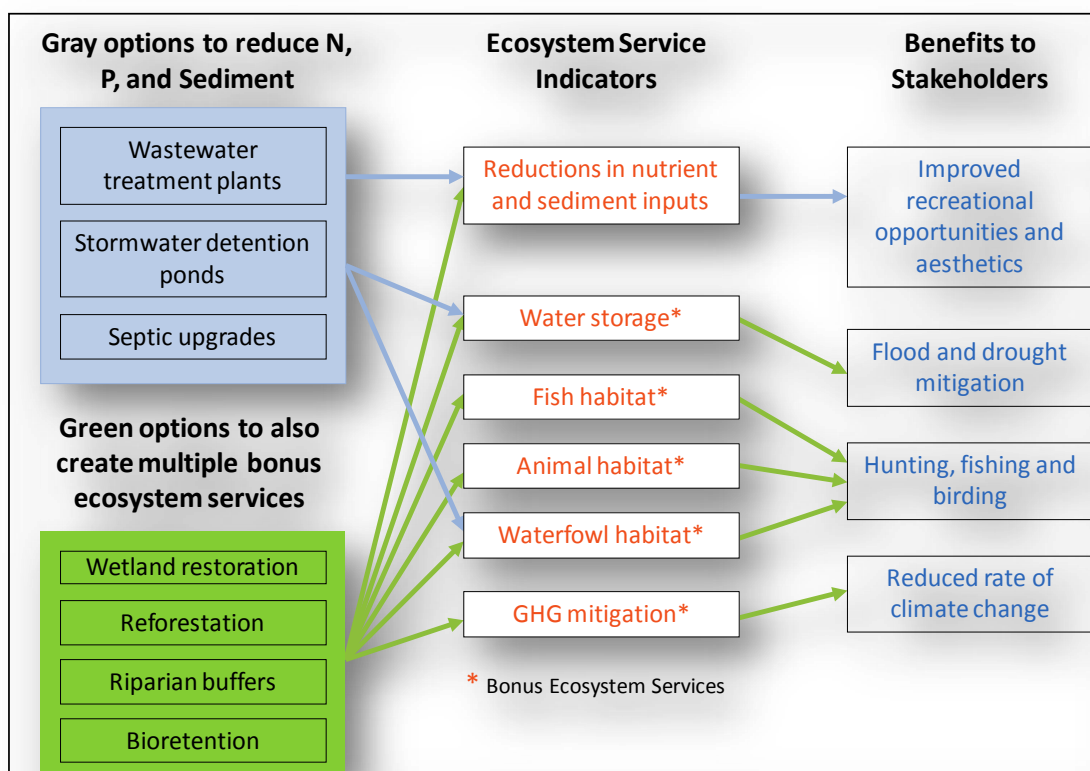


Figure 2: Schematic showing grey and green options to reduce pollution, and links to ecosystem service indicators and the benefits to stakeholders from those services (Note that in the schematic above Green House Gas or GHG mitigation refers to the regulating service that rehabilitated ecosystems may provide i.e. to increase carbon sequestration)

[Source: WWF – River Restoration: A strategic Approach to planning and management (in progress)]

River restoration is a relatively recent phenomenon, starting in the 1970s and 1980s in many countries, particularly in response to water quality issues associated with industrial development. In the United States, major works to protect and improve freshwater systems were to a great extent driven by the passage of the 1972 Clean Water Act (U.S. Senate, 1972). In Europe, the first major restoration projects included those in the Rhine, the Mersey, and the Danube Rivers, undertaken during the 1980s and 1990s. Notably, there have been limited examples of river restoration within developing countries. There are a number of possible explanations for this. Firstly, it may be that restoration has simply not been necessary. Until relatively recently, river systems within less developed countries or regions have been subjected to fewer stresses, although this is no longer the case in many places. Secondly, short-term economic growth through rapid industrialisation and agricultural development may have been given priority over environmental issues, meaning that development is allowed to progress at the expense of the environment. Finally, many developing countries are less likely to have had the institutional, technical or financial

capacity to undertake many water resource management activities, including river restoration.

❖ **Wetland and floodplain rehabilitation**

- In the **Danube River**, the first and most influential attempt to assess restoration potential was an evaluation under the Danube Pollution Reduction Programme (DPRP) in 1999, funded by UNDP and GEF (Global Environment Facility). The evaluation focussed on lateral connectivity and morphology along the main stem and five major tributaries of the Danube, i.e. floodplain restoration, and was undertaken to define priority wetland and floodplain rehabilitation sites.
- The evaluation classified floodplain sites according to floodplain type, width and land use (conducted by WWF), and used experts in each participating country to ensure full participation at the national level while taking into account local priorities in identifying the potential for wetland restoration. The potential for restoration to contribute to nutrient pollution reduction, as part of the DPRP was then emphasised, giving priority to certain locations. This resulted in the listing of 17 wetland or floodplain sites across the basin recommended for restoration considering their ecological importance, their nutrient removal capacity and their role in flood protection.
- Wetland rehabilitation is a well-established activity in SA. Working for Wetlands, established in 2002, although housed under DEA, is a joint initiative of the Departments of Environmental Affairs, Water and Sanitation and Agriculture, Forestry and Fisheries. This illustration of cooperative governance and partnerships comes to life through projects that focus on the rehabilitation, wise use and protection of wetlands in a manner that maximises employment creation, supports small businesses and transfers relevant and marketable skills to beneficiaries. Of particular importance with regards to WQM is the recent shift in the approach used to prioritise wetlands for rehabilitation where aspects such as a wetlands ability to support downstream water quality objectives now forms part of a prioritisation matrix.

5.6 Seizing the Opportunities

The above section highlights new opportunities to rethink the way we look at and tackle WQM. It is clear that the existing policies and strategies have an array of strengths and weaknesses that need to be explored with an understanding of both the current and future contexts. The opportunity now exists to review, revise and refine, but with the types of strategic opportunities described above, there is the real opportunity to improve and innovate.

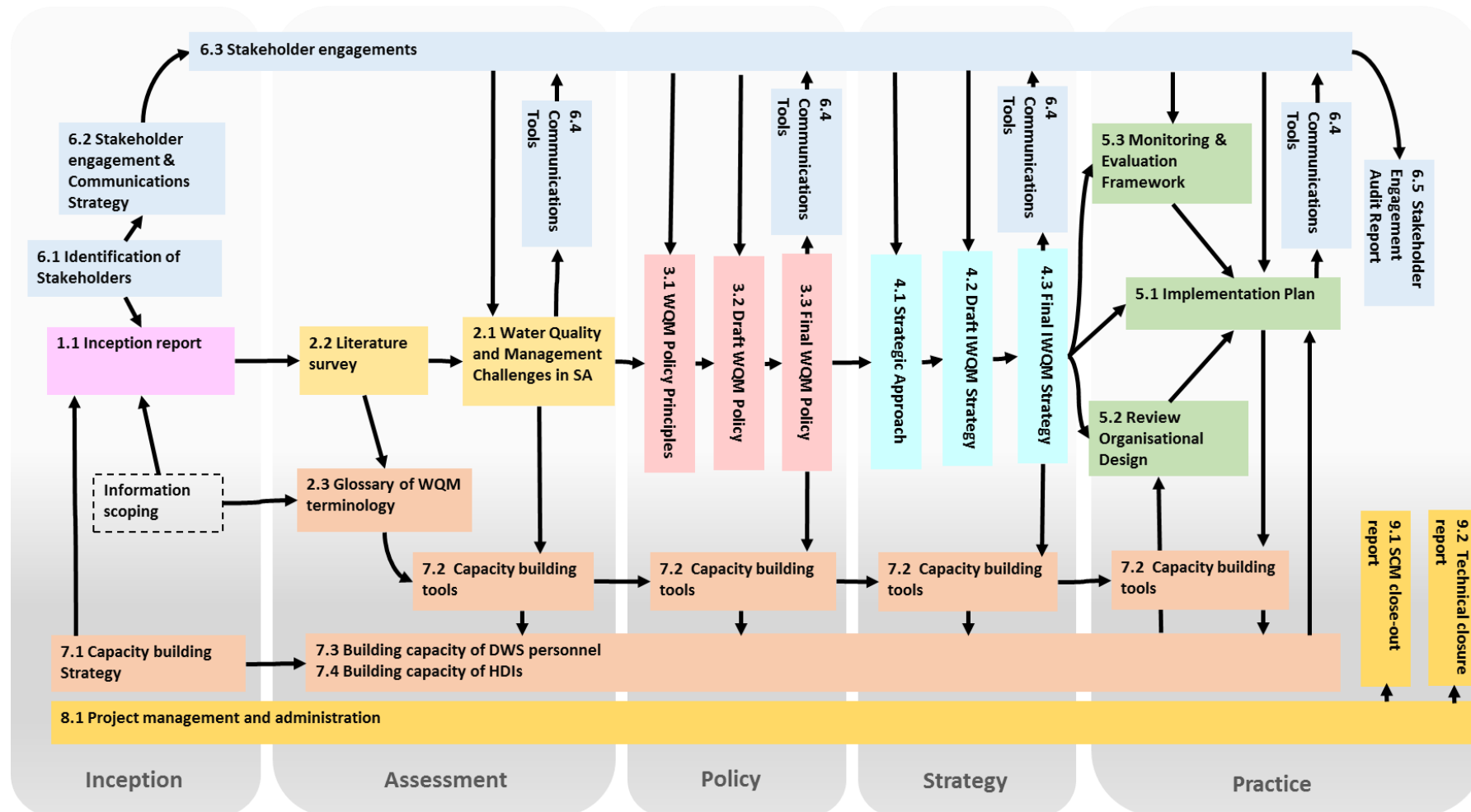
It has to be understood that this does not come easily and that the development of new ideas and thinking requires considerable political and strategic support in order to see these ideas

becoming part of policy and strategy. This emphasises the importance of a thorough and engaged policy and strategy development process that see active engagement at various governance levels. Importantly, the process also needs to support active engagement across a range of sectors.

6. PROJECT TASKS AND DELIVERABLES

There is now realisation of the need to revisit the existing policies and strategies with regards to WQM. It is clear that it is imperative to review and refine where necessary and to develop new approaches if necessary, however, the intent is not to create new policy and strategic approaches for the sake of creating something new. The intent is then one of building upon the frameworks and experience that exists to further strengthen the approach and to find ways of addressing the various implementation and other related challenges.

The Terms of Reference for this project (Appendix B) provided a clear description of the intent of the project and reflected a pragmatic suite of steps that can realise the required outcomes. The tasks and activities reflected hereafter provides further clarification of those steps with additional detail to provide further alignment in the understanding of processes and timeframes. An overview of the project components are presented in Figure 3.



6.1 Tasks and Deliverables

Component 1: Inception

Key Considerations: The project relies heavily on inputs from all levels in the Department of Water and Sanitation. Three management structures have been proposed which have been designed to prevent fatigue amongst DWS officials, but also aims to ensure that the team receives the necessary guidance at key points in the project.

Whilst the project may be run from the national department, it will impact the provincial offices and CMAs as well. In light of this, the project team will undertake to get the necessary documentation needed for the approvals for those staff members that sit outside of the national department to ensure that they are part of the process.

Task 1: Compile the Inception Report

As with any project, there is a need at the outset to establish an aligned plan for project implementation. In complex projects, such as this project, that involve both technical and institutional dimensions, this is particularly important. Issues to be clarified would include such matters as:

- Key process steps and timeframes;
- Resource allocations;
- Key documentation and information gathering;
- Expectations of the client in terms of deliverables;
- Issues for which the client will take responsibility and
- Project management structures and reporting requirements.

This report is informed from outcomes of previous consultations that were undertaken by The Department and Water Research Commission(WRC) such as the internal DWS workshop which was held in November 2013 and the WAT-Indaba in February 2015 as well as the breadth of experience of the individual team members based on their on-going work in the Water Sector. In addition, a PAC01 meeting was held on 23rd October 2015, followed by the PMC01 meeting on 23rd November 2015 and this report is a reflection of those discussions.

Deliverable 1: Inception Report

Component 2: Situation Assessment and Gaps Analysis

Key Considerations: Chapters 2-5 highlighted that there are at least five fundamental ways in which on water quality is deteriorating in South Africa. These WQ related problems stem from a number of WQM related challenges and many of these problems will be and are exacerbated by climatic impacts. Solutions to these problems need to be adaptive in order to build in climate resilience. The chapters also identified a few strategic institutional implications that will need to be addressed. Lastly, the shift in paradigm to managing water quality that will need to be weaved into the policy, strategy, implementation plan was highlighted as well as the need to re-look at the financing mechanisms.

Task 2.1: Identification of Water Quality and WQM challenges for South Africa

This task will provide a description of the biological, physical and chemical water quality challenges in South Africa and will aim to gain an understanding of their impacts and topography. It will be important to understand which water quality challenges are localised and which provide a greater threat to SA's water resources. This assessment will be based on existing literature/studies as well as the outcomes from engagement with key stakeholders. An assessment of future trends as it relates to the expansion or contraction of dense settlements, the coal mining roadmap and its direction and shifts towards urbanisation, amongst others, will be used to further inform potential future water quality threats to SA's water resources. Together with inputs from relevant provincial governmental offices and key water quality experts, a consensus will need to be reached on the major challenges to critically focus on in the immediate term versus those challenges that need to be resolved over the longer term, based on future trends.

A root cause analysis of those major challenges will be conducted to provide insight and guidance on the types of changes required to mitigate them by considering the water use sectors, governance arrangement, institutional alignment and financing mechanisms.

The SWOT analysis will be used to identify the strengths, weaknesses, opportunities and threats for WQM in South Africa at a high-level, and be used to inform the WQM Policy and IWQM Strategy going forth.

The findings will be work shopped with relevant stakeholders to ensure a comprehensive document is drafted as "Edition 1" for the approval process.

Deliverable 2d: Note on Water Quality and WQM in South Africa

Deliverable 2e: Water Quality and WQM Challenges in South Africa - Edition 1

Task 2.2: Literature Survey

The literature survey will consist of two principle activities. Firstly, it will provide a comprehensive review of WQM in the South African context and will document a summary of existing policies, strategies and management tools. Secondly, it will look to draw on international experience and best practice guidelines to demonstrate potential and innovative solutions to the water quality management challenges facing South Africa. It is crucial to get a combination of different experiences and practices from countries that are comparable to South Africa i.e. have similar GDPs, economic sectors, climate, policies, WQ challenges and socio-economic challenges from both developing and first world countries.

Deliverable 2a: Literature Review – Inaugural Report
Deliverable 2b: Final Literature Review – Edition 1
Deliverable 2c: Literature Database

Task 2.3: Compile a glossary of WQM related terminology

A glossary of WQM related terminology will be compiled throughout the project and submitted. A draft report will be submitted a few months into the project, this will be updated through the project and finalised towards the end of the project.

Deliverable 2f: Glossary of WQM terminology – Inaugural Report
Deliverable 2g: Glossary of WQM terminology – Edition 1

Component 3: Development of a WQM Policy

Key Considerations: The WQM policy needs to address effectively what needs to be done, where this is needed as well as how this is to be achieved. As such, the policy then provides the objectives in managing water quality, noting that there may be both geographic and specific technical dimensions, as well as indicating that there are various institutional and governance dimensions.

Task 3.1: Development of WQM Policy Principles

A review of the 1991 and 2006 WQM policy documents, as well as other pertinent documents, will be undertaken and based on the challenges and gaps as well as opportunities for the policy to be progressive as identified in Component 2, principles for the WQM policy will be drafted.

These principles will be structured hierarchically and will be articulated as statements of intent. Guidance will be required by the PMC and PSC to ensure that there is consensus on the principles, which will be used to frame the WQM Policy.

Deliverable 3a: Note on the principles for the WQM Policy

Task 3.2: Development of Edition 1 WQM Policy

The policy will look to align existing government imperatives. Based on the approved policy principles, the draft policy will be work shopped to obtain stakeholder input as well as ensure that horizontal and vertical integration is considered as well as integration with the larger policy frameworks. Cognizance will be given to the amalgamation of the NWA and Water Services Act (Act 108 of 1997) (WSA), as well as the fact that the WDCS and the Pricing Policy are still under consideration within the Department. Furthermore, whilst it is important that the Policy be practicable, the project team will endeavour to ensure that it is also forward looking and progressive.

Deliverable 3b: WQM Policy – Edition 1

Task 3.3: Development of Edition 2 WQM Policy

The WQM Policy will be updated based on stakeholder, PAC, PMC, and PSC inputs. Top Management approval of this Edition is required and support will be provided in developing submissions and presentations in order to obtain this approval. The Foreword for this Edition of the policy will be developed for approval by the Director-General or Minister. Any requested amendments will be made accordingly.

The signed foreword will be added to the policy and a final WQM policy document will be produced together with a summary version and a brochure that will serve as the user-friendly version.

Deliverable 3c: WQM Policy – Edition 2
Deliverable 3d: Summary of WQM Policy
Deliverable 3e: WQM Policy Brochure

Component 4: Development of an IWQM Strategy

Task 4.1: Development of the IWQM Strategic Approach

In developing the strategy it will be important to clarify the time horizon for this strategy. At this inception stage, the intent for the WQM Strategy is to focus on a 20 year time horizon and will be developed in accordance with the WQM Policy as well as various other existing strategies that the Department currently has in place and are under review.

This strategy document will give effect to the WQM Policy by:

- Outlining the functional mandates both within the Department and at sector level;
- Describing the institutional and management arrangements, resource (financial and human capacity) requirements and organisational implications;
- Ensuring an integrated approach to WQM noting the array of governance challenges that this creates;
- Identifying pragmatic adaptive management principles;
- Providing clear direction to other scales of strategy and implementation;
- Identifying priorities for implementation;
- Describing financial arrangements, including financial flows, sources of capital and financial systems requirements;
- Describing key risks and risk management approaches; and
- Describing the sub-strategies.

The first step would be for an agreed strategic approach. Guidance will be required from the PAC, PMC and PSC to ensure that there is consensus on the approach, which will be used to frame the IWQM Strategy.

This strategic approach will be taken to Top Management for approval. Support will be provided to prepare submissions and presentations for this approval process.

Task 4.2: Development of the Edition 1 IWQM Strategy

The development of the strategy will consider existing approaches and practices and how these are effectively used in undertaking WQM. The intention is not to remove or re-develop practice where this is being effective. Additional considerations will be aspects such as:

- application of regulatory approaches;
- financial aspects;

- self-regulation and civil instruments;
- research and innovation;
- communication, capacity building and empowerment;
- mechanisms for integration and cooperation;
- various thematic water quality issues;
- emerging issues such as water quality offsetting and the use of buffer zones;
- non-point source management;
- climatic impacts;
- the food-water-energy nexus; and
- compliance, monitoring and enforcement.

Once Edition 1 of the IWQM Strategy has been drafted, this will be work shopped and consulted with key stakeholders as well as wider stakeholder platforms to ensure a robust and inclusive strategy. Edition 1 will be presented to the Department's Top Management and support will be provided in preparing the necessary submissions and presentations.

Task 4.3: Development of Edition 2 IWQM Strategy

The IWQM Strategy will be finalised based on the inputs received during Task 4.2, as well as with additional inputs from the PMC and PSC. A Foreword will be prepared for the approval and signature of the Director-General and/or Minister.

Deliverable 4a: Note on the Strategic Approach
Deliverable 4b: Draft IWQM Strategy – Edition 1
Deliverable 4c: Final IWQM Strategy – Edition 2
Deliverable 4d: Summary of IWQM Strategy
Deliverable 4e: IWQM Strategy Brochure

Component 5: Converting Policy into Practice

Key Considerations: It is imperative that an implementation plan is developed that provides a pragmatic and holistic route map for the delivery of policy and strategy. This needs to reflect the roles, responsibilities, time-frames and resource requirements of DWS and other governmental and non-governmental role-players. In developing this implementation plan, it will be important to align with the implementation of other key and relevant policies and strategies.

In the conversion from policy/strategy into practice and to align with the SDGs and the broader water-related development agenda of the country, requires a coordinated; fit-for-purpose monitoring systems that serve multiple actors, scales, and applications.

Task 5.1: Development of the Implementation Plan

This task will outline the steps required to operationalize the WQM Policy and IWQM Strategy.

Priorities for implementation and future deployment will be determined based on the assessment of the impacts and the urgency, speed or time frame, within which implementation needs to be carried out. The actual identification and assessment of the priority catchments will also be influenced by resource availability, by risk and using stakeholder inputs and will to a large degree be informed by the outcomes of the SWOT analysis undertaken in Task 2.1. Potential criteria for the assessment of priorities are:

- *Identification of persistent, national water quality problems;*
- *Impact assessment of implementation of the IWQM Strategy;*
- *Urgency for actual implementation;*
- *Expected effort in terms of the amount of resources, time and cost required; and*
- *Institutional capacity, cooperation and ability to manage the implementation process.*

One of the outcomes of the prioritisation is to develop 5 concept plans that will form part of the technical close-out report. A risk analysis will also be conducted where by the identification and mitigation of risks will be outlined.

Deliverable 5a: Edition 1 Implementation Plan
Deliverable 5b: Edition 2 Implementation Plan

Task 5.2: Monitoring and Evaluation Framework for WQM Policy and IWQM Strategy

The aim of this task is to provide the Department with a framework/ tool that can be used to monitor and evaluate the implementation of the WQM Policy and IWQM Strategy. Results-based monitoring and evaluation is a continuous process of collecting and analysing

information to compare how well a project, program, or policy is being implemented against expected results.

As the Department seeks to align the expenditure framework with policy outcomes, measuring the organization's performance in support of achieving outcomes is important. The efficiency of service delivery, the quality of program and policy implementation, and the effective management of resources are critical, specifically with regards to water quality. The framework will address the following:

- *Gendered baseline data to describe the problem or situation before the implementation of the IWQM Strategy;*
- *Identification of indicators for assessment of the outcomes;*
- *Data collection on outputs and how and whether they contribute toward achievement of outcomes;*
- *Focus on perceptions of change among stakeholders;*
- *Systemic reporting with more qualitative and quantitative information on the progress toward the outcomes; and*
- *Capturing information on success or failure of strategy/policy with stakeholders in achieving desired outcomes.*

The draft framework will be tested as part of the project and based on the outcomes, be revised to ensure that the appropriate coordination platforms and approach is used before finalisation in Edition 1.

Deliverable 5c: Note on the Monitoring and Evaluation Framework

Deliverable 5d: Monitoring and Evaluation Framework – Edition 1

Task 5.3: Review of WQM Organisational Design

WQM is not only the responsibility of DWS but also is the responsibility of various other sector role-players. Therefore, an institutional analysis is required to understand the broader governance environment. With this framework, it will then be pertinent to review the existing WQM functions and structures within the current DWS structure, and make recommendations for improvements to this structure so as to ensure that the objectives of the WQM Policy and Strategy are achieved. This will be supported by the development of a high level business process map which will provide the key functional roles, linkages and accountabilities.

The findings will be work shopped with the relevant line managers/directorates/sub-directorates as well as the PAC,PMC and PSC.

The report will also provide concept inputs to work plans of relevant officials, based on the outcomes of the WQM Organisational Report.

Deliverable 5e: Note on the WQM Organisational Design
Deliverable 5f: WQM Organisation Design – Edition 1
Deliverable 5g: Concept Work Plans

Component 6: Stakeholder Consultation and Communication

Key Considerations: Noting the multi-sectoral nature of WQM and the fact that WQM has broad socio-economic implications, it is critical to ensure that the development of the Policy, Strategy and Implementation Plan has a robust stakeholder engagement process. It is important to recognise that engagement does take place in differing ways and using differing communications approaches. Not all stakeholders need to be engaged in the same way and as such this aspect of the project will be tailored in an on-going manner to meet the requirements of the project as well as meeting the information and engagement needs of the various stakeholder groupings.

Task 6.1: Identification and formation of the Stakeholder Groups

The purpose of identifying the stakeholder groups would be to delineate those stakeholders which have a similar context in which they operate and which may provide scale and sector specific guidance and inputs to the development of the WQM Policy, IWQM Strategy and its implementation plan. The groups will also provide unique insights and experiences regarding water quality challenges and give the project access to additional information that the Department and project team may not otherwise have access to.

In order to avoid stakeholder fatigue, there needs to be targeted engagements. Therefore, it will be necessary to understand what information is required then identify knowledge hubs where the project team can obtain and disseminate information. This will be outlined in the Stakeholder Engagement and Communication Strategy.

Deliverable 6a: Note on the stakeholder groups

Task 6.2: Stakeholder Engagement and Communication Strategy

The Stakeholder Engagement and Communication strategy will look to outline how the team proposes to engage, inform and consult the various stakeholders. An analysis of identified stakeholders will be necessary to identify the following groups:

- Low interest, low influence – those you need to keep informed;
- High interest, low influence – those you need to involve and consult with; and
- Low interest, high influence – powerful stakeholders you need to engage.

A matrix can be used to map their involvement in the most appropriate way by defining the purpose for each engagement, such as policy review, identifying current WQ impacts, access to existing databases, and so forth. The next step will be to identify the best approaches to inform, consult or collaborate with the stakeholders. For example; this can be done through digital tools and/or traditional engagements tools such as paper questionnaires, information road shows, face-to-face meetings, focus groups, newsletters and brochures. This will be mapped out in an engagement matrix.

This Strategy will also look to outline how to manage and document the various inputs from the stakeholders either through comments registers or alternative means. The strategy will be finalised based on inputs from key stakeholders and well as the PAC, PMC and PSC.

Deliverable 6b: Stakeholder Engagement and Communication Strategy

Task 6.3: Stakeholder Engagements

Based on the communication strategy, there will be a number of engagements that will take place either in the form of workshops, focus group or just one-to-one meetings. These engagements will be documented with minutes and attendance registers to ensure that all inputs are taken into consideration when drafting the policy and strategy. Furthermore, a comments register will be developed to keep track of all inputs and will capture the project responses to these inputs.

The Terms of Reference has indicated a number of workshops as well as a national conference which will also form part of the engagements. In addition, there are approximately 80 active Catchment Management Forums (CMFs) in SA, and presentations on the project will be undertaken at as many of these CMF's, as and when possible, by the DWS WQP staff. The necessary material (presentations) will be provided to support this activity as the project proceeds.

- Deliverable 6c:** Provincial Road Show 1
- Deliverable 6d:** Provincial Road Show 2
- Deliverable 6e:** Provincial Road Show 3
- Deliverable 6f:** Provincial Road Show 4
- Deliverable 6g:** Provincial Road Show 5
- Deliverable 6h:** Provincial Road Show 6
- Deliverable 6i:** Provincial Road Show 7
- Deliverable 6j:** Provincial Road Show 8
- Deliverable 6k:** Provincial Road Show 9
- Deliverable 6l:** National WQM Workshop
- Deliverable 6m:** National WQM Symposium

Task 6.4: Communication Tools

These are primarily documents that will be used during the project for various engagements or information sharing as well as a finalised pack of documents for the Department's records. The project manager has outlined a number of final deliverables that need to be submitted. These include:

- Information sharing portal;
- Finalised reports;
- Summarised versions;
- Brochures;
- Presentations (summary and capacity building);
- Newsletters; and
- Banners.

The development of the various communications tools will take place throughout the project, with timeous release so as to support on-going project processes and to keep stakeholders abreast of developments.

It is important to note that these products will all be quality products that will be technically correct, and will have the approval of the DWS.

Deliverable 6n: Newsletter 1 - WQM Status Quo

Deliverable 6o: Newsletter 2 - Policy

Deliverable 6p: Newsletter 3 - Strategy

Deliverable 6q: Newsletter 4 - Implementation, Monitoring and Evaluation

Deliverable 6r: Project Information Management Database

Deliverable 6s: IWQM Project web page content

Deliverable 6t: DWS IWQM Banners

Task 6.5: Stakeholder Engagement Report

An audit report will be submitted that reflects the successes and challenges of the stakeholder engagement strategy that was developed as well as makes recommendations for future stakeholder engagements. This report will then provide:

- An overview of stakeholder engagements held through the course of the project;
- An analysis of the levels of engagement of the various sector groupings;
- An analysis of participation of gender and racial groups; and

- A plan for future stakeholder engagements and communication by the DWS in order to further strengthen the roll-out of the Policy, Strategy and Implementation Plan.

Deliverable 6u: Stakeholder Engagement Audit Report

Component 7: Capacity Building

Key Considerations: A Capacity Building Strategy will be developed which will outline the principles of capacity building as well as illustrate a programme to achieve capacity building that is both internal and external to the Department. It will also highlight the boundaries in which the capacity building will take place so as not to create false expectations. It is crucial to have the support from the Department for this Component, to ensure that the key individuals selected for capacity building sessions are available and engaged.

Task 7.1: Development of a Capacity Building Strategy

A capacity building strategy will be developed during the Inception Phase. This strategy will take a holistic view of how capacity building can be achieved through various mediums and highlight a handover process whereby the targeted key personnel are able to take once this project concludes.

Deliverable 7a: Capacity Building Strategy

Task 7.2: Development of training tools

Training tools specific to the WQM Policy, IWQM Strategy, Implementation Plan and Monitoring and Evaluation Framework will be developed that take into consideration experiential learning. The objective of capacity building associated with the policy and the strategy will be to develop a knowledge hub within the Department for the implementation of the policy and strategy so that they can become the champions going forward. Capacity building associated with the implementation plan and operating rules for the Monitoring and Evaluation work has an objective to ensure effective communication and use of the framework in engaging with water users, in addition to implementing the operating rules effectively and equitably. Training tools will be developed based on the contents of key deliverables as indicated in tasks discussed above.

The fundamental outcome is to ensure that capacity is built within relevant national, provincial and catchment organisations to ensure continuity beyond the end of the project and the ability of these organisations to implement, monitor, review and refine the strategies and implementation.

It should be noted that the overall Training Tool Kit will also comprise of the presentations that will be developed through the project, and be combined into a single consolidated set of training tools.

Deliverable 7b: Training Tools for key deliverables (at key points in the project or as identified)

Task 7.3: Capacity Building of key DWS Personnel

The project will use the concept of *Professional Counterpart Teams* (PCTs). This approach recognises that, whilst DWS staff in national office and the provincial offices are extremely stretched, experiential training is often most effective. Therefore, during the start-up phase of this project key individuals will be identified to almost “twin” in the development and implementation of this project.

The main roles and functions of a PCT approach are to ensure that DWS staff:

- Attend brainstorming and workshop sessions to plan and develop key elements of the project;
- Disseminate information, understanding and knowledge back into their respective organisations to ensure that broader capacity is built;
- Participate in stakeholder engagement sessions to foster improved relationships and understanding of stakeholder perspectives and issues and
- Monitor relevant elements of the capacity building programme and where necessary ensure its adaptation to emerging issues.

It is important to note that these individuals, or the structure of the PCT, could vary over time and with aspects of the project such as policy, strategy, implementation, monitoring and review.

Fixed Capacity Building Sessions

Whilst there will be information sharing at the various engagements, the building of capacity will also be supported by a number of fixed sessions that correlate with the key areas for capacitation and will make use of the training tools. Additional scoping of the training activities will be done following initial consultation with DWS, both at national level and in the regions. The programme will be informed by the assessment and strategic planning processes that are discussed as part of the approach above, with timeline and target audiences developed in conjunction with DWS. An important opportunity in these fixed capacity building sessions is the expansion of understanding from national office to the

provincial office to assist their preparedness for the implementation of the WQM Policy and Strategy in their catchments.

An audit report will be submitted that reflects the successes and challenges of the Capacity Building Strategy that was developed as well as makes recommendations for future capacity building sessions.

Deliverable 7c: Capacity Building Audit Report

Task 7.4: Capacity building of HDIs

Throughout the course of the project the team will have a strong focus upon developing HDI professionals. This will be a key focus of the overall capacity building programme, however, due to its importance this is also lifted out as a separate task that will see HDI officials and HDI consultants being developed. Their participation on the team will broaden their experience and competence in the field of policy, strategy and legal aspects relating to the broader water sector and specifically to water quality management.

Reporting on achievements during the course of the project will be essential.

Deliverable 7d: On-going capacitation of the HDIs

Component 8: Project Management and Administration

This project is highly complex, with significant implications for the country and affecting a number of stakeholders. Consequently, effective and diligent project management is required. It will be prudent for the project team to also ensure effective engagement, documentation of strategic decisions and strategic oversight.

Key Considerations: In order to ensure effective project management and administration various systems will need to be put in place to track and report on the financial and technical progress of the project, ensuring that early warning signs of potential problems are brought to the attention of the project manager to allow for effective control. It is noted that this project is high on the priority list of the DWS and has strict and short time lines, within which the activities of the project must operate. It is also crucial to have consistent and engaged participation from the project committees in order to ensure a successful project.

Task 8.1: Project Management and Administration

The objective of this activity is to ensure efficient and effective administration and management of the project, and the management of project risk. In order to ensure this, the approach will be:

- Coordination between parallel tasks and integration of project teams;

- On-going engagements to ensure project team alignment with client expectations;
- Quarterly progress reports to be provided, and support to other reporting requirements;
- Administrative and financial management of the project;
- Identification of project risk and implementation of risk management mechanisms; and
- Assisting to ensure alignment of this project with other key DWS policies/strategies.

There will be three types of project committees, which will govern the project. However, it will be necessary from time to time to engage with the two Deputy Director Generals (of the Branch Planning and Information, and Regulation), the Director General, the Top Management Policy Committee, the Minister (and potentially Cabinet), for certain main deliverables such as the WQM Policy and IWQM Strategy.

- **PROJECT ADMINISTRATION COMMITTEE (PAC)**

- **Role**

- *The PAC consists of the Client and the PSP. The committee will be responsible for the day to day management of the project and will typically meet on a monthly basis, or as needed.*

- **PROJECT MANAGEMENT COMMITTEE (PMC)**

- **Role**

- *The PMC will consist of representatives from DWS WQM Line-function Directorates and Sub-Directorates from both National and Provincial Office and will be responsible for ensuring that the concerns and requirements of each WQM -line function are addressed and that deliverables are suitable for presentation/distribution to the PSC and other external platforms. This committee meets at key milestones in the project, as indicated in the project schedule provided in Section 6.2, below.*
 - *It is important to note that the members of this committee will be the implementers of various aspects of the project, both at national office and within the provincial offices.*

- **PROJECT STEERING COMMITTEE (PSC)**

- **Role**

- *The PSC will consist of representatives from DWS, other Govt. Departments (Department of Mineral Resources, Department of Environmental Affairs,*

National treasury, Department of Agriculture and South African Local Government Association), relevant external stakeholders (such as key Public Institutions, sector associations (such as the CoM) and NGO's), the various water management institutions (CMA's, WUA's) and key water service providers (Randwater, MidVaal, Sedibeng Water). It will be responsible for providing strategic direction and technical input. The PSC will meet at key project milestones.

- *It is important to note that the members of this committee will be the ambassadors for inter-and intra-governmental cooperation, (In other words, Senior to Middle Management. Director level or higher.)*

The way in which committee meetings align with stakeholder engagements and the exact timeframes and nature of the meetings will form part of the Stakeholder Engagement Strategy, which will take a more holistic view of these processes.

As part of the project management and administration there are a few aspects of deliverable production that are clear, namely:

- All deliverables need to be produced in high quality colour;
- All documents will be drafted as various “Editions” recognising that documents will be improved and strengthened as the policy and strategy is developed over time;
- All deliverables will be circulated to the project committees for comment with at least two weeks to provide written comment on the deliverable, after which “Edition 1” of the deliverable will be finalised for approval;
- Deliverables are to be approved by either the Director: Water Resource Planning Systems or the DWS project Manager.
- Top Management sanction will be required and the final edition of each main deliverable, after approval by the D: Water Resource Planning Systems, will be circulated to Top Management for their approval; and
- The Foreword for the Policy and Strategy is to be signed by the DG, Deputy Minister and Minister.

Deliverable 8a - 8h: Quarterly Reports and additional reports as needed

Component 9: Project Closure

Changes to the task: The project team has allowed for a two-month finalisation period for this component.

This component will ensure that the finalised documents will be standardised and submitted for dissemination and the appropriate letters drafted. These key deliverables will include printing of reports, brochures and presentations. The printing list is tabulated below:

Included in this component will be the submission of well organised electronic records of all the aspects relating to the project including e.g. meeting records, databases, cover page templates, etc.

Table 6: List of deliverables for printing

Printing of Deliverables	Number of sets
Inception Report (Final)	10
SA Water Quality and WQM Report (Final)	10
Literature Survey (Final)	10
WQM Policy (First Edition)	100
WQM Policy (Final Edition)	400
Summary and User friendly versions of the policy (Final)	400
IWQM Strategy (First Edition)	100
IWQM Strategy (Final Edition)	200
Summary and User friendly versions of the strategy (Final)	200
Policy into Practice Report (First Edition)	100
Policy into Practice Report (Final Edition)	100
WQM Organisational Report (Final)	20
Communication Strategy (Final)	10
Technical Close-out Report (Final)	10

Task 9.1: Supply Chain Management Close-out report

This task will review the overall performance of the project against the scope of work as provided in the Terms of Reference, will reflect upon the challenges that have been experienced and will identify lessons learnt during the process. The task will also comment on the financial management of the project and will report on the expenditure in terms of gender and race.

Task 9.2: Technical Close-out report

This report will review the project from a technical perspective and will not only assess performance against the scope of work, but will provide a forward facing assessment of the work needed to be undertaken in the future to further embed and strengthen the Policy, Strategy and Implementation. This task will expand on the priority WQM gaps that were identified and agreed during the project and provide a brief work plan to address at least 5 of these gaps that the Department can take forward to implementation.

Deliverable 9a: Supply Chain Management close-out report

Deliverable 9b: Technical close-out report

6.2 Project Programme

The project programme and a key for the colours and abbreviations used in the programme is provided below.

Table 7: Key to the project programme

KEY	
	Payable deliverable
	Work in progress
IR	Inaugural Report
N	Note
Ed	Edition
QR	Quarterly Report
RS	Provincial Road Show
NW	National WQM Workshop
NS	National WQM Symposium
NL	Newsletter
M	Project Management Meetings
S	Project Steering Meetings

		YEAR			2015												2016												2017											
		MONTH			O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S												
COMPONENT 1: INCEPTION																																								
Task 1.1	Compile Inception Report			Ed1																																				
COMPONENT 2: SITUATION ASSESSMENT AND GAP ANALYSIS																																								
Task 2.1	WQ and WQM challenges for South Africa				N		Ed1																																	
Task 2.2	Literature Survey				IR																					Ed1														
Task 2.3	Glossary of WQM terminology				IR																					Ed1														
COMPONENT 3: DEVELOPMENT OF A WQM POLICY																																								
Task 3.1	Development of WQM Policy Principles								N																															
Task 3.2	Development of draft WQM Policy										Ed1																													
Task 3.3	Development of final WQM Policy																				Ed2																			
COMPONENT 4: DEVELOPMENT OF A IWQM STRATEGY																																								
Task 4.1	Development of the Strategic Approach												N																											
Task 4.2	Development of the draft IWQM Strategy													Ed1																										
Task 4.3	Development of the final IWQM Strategy																				Ed2																			
COMPONENT 5: CONVERTING POLICY INTO PRACTICE																																								
Task 5.1	Development of the Implementation Plan																				Ed1			Ed2																
Task 5.2	Monitoring and Evaluation Framework																						N		Ed1															
Task 5.3	Review of WQM Organisational Design																N								Ed1															
COMPONENT 6: STAKEHOLDER CONSULTATION & COMMUNICATION																																								
Task 6.1	Identification of the Stakeholder Group																								FD															
Task 6.2	Stakeholder Engagement and Communication Strategy					Ed1																																		
Task 6.3	Stakeholder Engagements														RS	RS	NW					NS																		
Task 6.4	Communication Tools							NL1			NL2						NL3							NL4			FD													
Task 6.5	Stakeholder Audit Report																								Ed1															
COMPONENT 7: CAPACITY BUILDING																																								
Task 7.1	Development of Capacity Building Strategy			Ed1																																				
Task 7.2	Development of training tools																									FD														
Task 7.3	Capacity Building of key DWS Personnel																									FD														
Task 7.4	Capacity Building of HDI's																																							
COMPONENT 8: PROJECT MANAGEMENT AND ADMINISTRATION																																								
Task 8.1	Project management and administration			QR			QR				QR				QR			QR			QR			QR			QR													
	PMC and PSC Meetings		M1			M2					M3			S2		M4				M5		S3		M6	S4	M7														
COMPONENT 9: PROJECT CLOSURE																																								
Task 9.1	SCM close-out report																										Ed1													
Task 9.2	Technical Closure report																									Ed1														

7. THE PROJECT TEAM

The PSP team management and composition is indicated in the Figure below. It shows the overall project management structure and the breakdown of the team into work streams, reflecting the key disciplines required for the project.

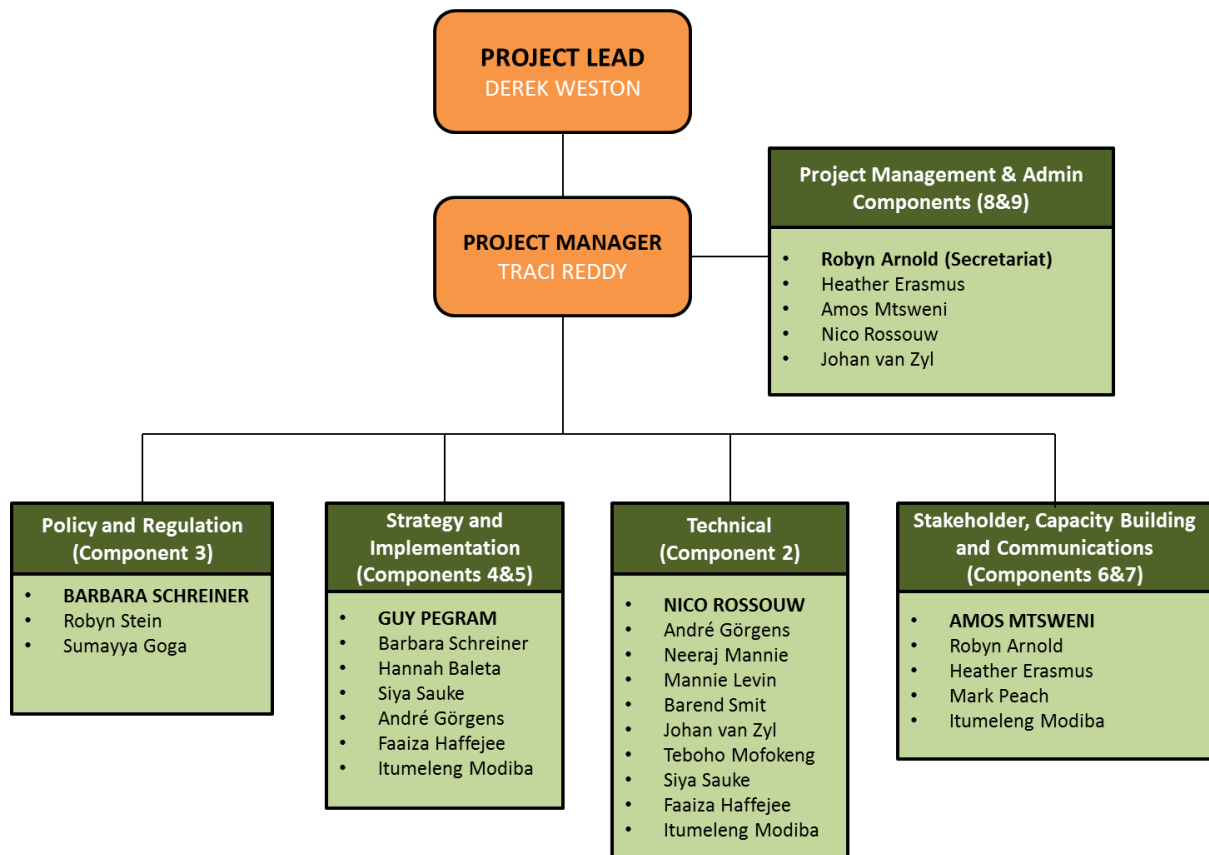


Figure 4: Project Team Organogram

Derek Weston, as Project Lead will be responsible for the overall delivery of the project supported by Traci Reddy as Project Manager and Robyn Arnold as secretariat. Derek will be responsible for overall team guidance and ensuring alignment between the policy, strategy and implementation aspects of the project.

In constructing the project team, four strategic water resource management advisors that collectively have in excess of one hundred years of experience have been secured. This includes Dr Guy Pegram, Ms Barbara Schreiner, Professor André Görgens and Professor Robyn Stein. These strategic advisors will act as a “brains-trust” for the project and will provide strategic guidance throughout the course of the project.

Barbara Schreiner, together with Robyn Stein lead the policy and regulatory pieces, with support from the team to ensure alignment going forward. **Guy Pegram** will be responsible

for developing the IWQM Strategy as well as conversion into practice. Guy is supported by a number of technical members as seen from the figure above.

Nico Rossouw will be responsible for technical inputs, and in particular, the development of the situation assessment and gaps analysis. He is supported by Andre Gorgens and other team members.

Amos Mtsweni, together with support from Traci Reddy and Robyn Arnold will lead the stakeholder engagements and capacity building aspects of the project.

8. RISKS MANAGEMENT MATRIX

Noting the current water resource management context, and the various related challenges is important at the outset of any project and provides a basis for understanding where key programmatic blockages may exist and how, as a project, these can be managed.

A risk matrix has been developed which describes the type of risk, the impact and likelihood of the risk, the mitigation or control actions that can be taken and the timeframe for the risk for the individual tasks outlined for this project. The risk matrix will be updated and monitored on an on-going basis together with input from the PAC, PMC and PSC. An initial list of risks associated with the project delivery has been identified and actions will be taken to manage these risks going forward

Table 8: Risk Matrix

RISK CATEGORY	RISK RATING	RISK	IMPACT RATING	MITIGATION ACTION
Timeframe for Implementation	M	There is urgency for the implementation of this project in order to improve and attain the desired level of water resource protection and use. The project comprises of three main delivery areas: WQM Policy, IWQM Strategy and an Implementation Plan, all of which require full-scale consultation. It should be recognised that consultation processes are time consuming, complex and often do not adhere to schedules. Approvals from Top Management are factored into the timeframes for the project, but understanding that managers are extremely busy, there	H	<ul style="list-style-type: none"> ▪ On-going contact with the PAC to keep them abreast of potential slippage in the project timeframes so that these are managed accordingly. ▪ PAC to advise project team on an on-going basis as to process and timeframes for approvals by Top Management.

		is recognition that slippages in obtaining these approvals may occur.		
Consistent and sustained engagement from DWS Staff in PMC and PSC as well as external stakeholders	M	<p>Apathy and lack of cooperation from all sectors could be a major roadblock in moving the processes forward. It is also important to get buy-in from senior members within a sector that are able to ensure strategic buy-in and influence decision-making.</p> <p>There has been increased public /media anxiety regarding water resource management challenges in the sector. Water quality issues are gaining more attention and these may distract or derail processes.</p> <p>There is some uncertainty about who are the champions to lead water quality management issues in a line function or province, or to action consequences. This may lead to inconsistencies in participation, or that there may be strategic disconnects within line functions and provinces.</p>	H	<ul style="list-style-type: none"> ▪ The project team has indicated that there will be one-to-one engagements as well as focus group meetings, which aims at drawing in key individuals or sectors in order to get their inputs. The project has support from the highest level in the Department and therefore there should be few roadblocks to buy-in and support. Senior management engagement may be needed to unlock any blockages. The PAC and Project Team will engage regularly to address such issues. ▪ The communications strategy will reflect the need to deal with on-going and upcoming issues. The strategy will put in place a range of communications approaches that will provide access to information. ▪ Through the capacity building process, the project will build water quality champions at both national office and the provincial offices. ▪ Specific individuals have been identified to participate in the PMC and PSC, and the participation at these meetings is essential. Management support for the on-going participation in the PMC and PSC is essential.

Amalgamation of the NWA and WSA	M	The Department is currently in the process of amalgamating the NWA and the WSA. A combined draft document has been prepared, but this is not yet in the public domain, and will not be in the near future. There are also uncertainties around the implementation of the WDSCS and the adoption of the Pricing Strategy. Therefore, it is unclear what the changes are and how this could impact upon the current project, however, this is a time intensive process and it is crucial that the project team, with the assistance of the client, be made aware of any major changes that could impact the project so the necessary amendments could be made.	M	<ul style="list-style-type: none"> ▪ PAC to keep project team appraised. ▪ Regular engagement with Chief Directorate; Policy and Strategy co-ordination
DWS Restructuring	M	The Department has in recent time's undergone changes in its structure and mandate, with the addition of sanitation services falling once again under its jurisdiction. It appears that the Department may be embarking upon another round of restructuring with the coming year. This has implications on the way we think about strategic approach as well as organisational dimensions. Furthermore, the disjointedness of water quality team within the department may become challenging.	M	<ul style="list-style-type: none"> ▪ PAC will keep the team abreast of any changes so that it will be taken into consideration when making recommendations for the WQM organisational structure. ▪ Engagement with PMC and PMC must inform on-going debates and discussions regarding the restructuring. ▪ The project team will engage with these processes in considering the organisational aspects of the project.
Training and Capacity Building	M	An important part of the project is the provision of training and capacity building to DWS officials so that they are able to implement the policy and strategy, in future. In order to do this, it is assumed that	M	<ul style="list-style-type: none"> ▪ DWS must ensure that staff members are available for any training and capacity building that is required and that there is consistency in participation

		the necessary posts have been created and filled, and that there are staff in place to absorb the training and capacity building and that the staff selected are committed to the process. It becomes important to have consistent, sustained and engaged staff members at these sessions.		
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*H = High, M = Medium, L = Low

9. FINANCIAL MANAGEMENT

9.1 Task and Component Budget

Table 9: Task and component budget

	Task total	14% VAT	Total Task Cost	Component Cost
	Excl. VAT		Incl. VAT	Incl. VAT
COMPONENT 1: INCEPTION				R 304 472
Task 1.1: Compile Inception Report	R 267 081	R 37 391	R 304 472	
<i>Deliverable 1a: Inception Report- Edition 1</i>				
COMPONENT 2: SITUATION ASSESSMENT AND GAP ANALYSIS				R 640 044
Task 2.2 : Literature Survey	R 107 814	R 15 094	R 122 908	
<i>Deliverable 2a: Literature Review - Inaugural Report</i>	R 73 464	R 10 285	R 83 749	
<i>Deliverable 2b: Literature Review - Edition 1 (Final)</i>	R 31 600	R 4 424	R 36 024	
<i>Deliverable 2c: Literature database</i>	R 2 750	R 385	R 3 135	
Task 2.1: WQ and WQM challenges for South Africa	R 434 112	R 60 776	R 494 888	
<i>Deliverable 2d: Note on WQ and WQM in SA</i>	R 276 712	R 38 740	R 315 452	
<i>Deliverable 2e: WQ and WQM in SA - Edition 1 (Final)</i>	R 157 400	R 22 036	R 179 436	
Task 2.3: Glossary of WQM terminology	R 19 516	R 2 732	R 22 248	
<i>Deliverable 2f: Glossary - Inaugural Report</i>	R 11 916	R 1 668	R 13 584	
<i>Deliverable 2g: Glossary - Edition 1 (Final)</i>	R 7 600	R 1 064	R 8 664	
COMPONENT 3: DEVELOPMENT OF A WQM POLICY				R 696 842
Task 3.1: Development of WQM Policy Principles	R 179 836	R 25 177	R 205 013	
<i>Deliverable 3a: Note on the WQM Policy Principles</i>				
Task 3.2: Development of draft WQM Policy	R 304 072	R 42 570	R 346 642	
<i>Deliverable 3b: WQM Policy - Edition 1</i>				
Task 3.3: Development of final WQM Policy	R 127 357	R 17 830	R 145 187	
<i>Deliverable 3c: WQM Policy - Edition 2</i>				
COMPONENT 4: DEVELOPMENT OF A IWQM STRATEGY				R 790 312
Task 4.1: Development of the strategic approach	R 237 670	R 33 274	R 270 944	
<i>Deliverable 4a: Note on the Strategic Approach</i>				
Task 4.2: Development of the IWQM Strategy -Draft	R 316 567	R 44 319	R 360 886	
<i>Deliverable 4b: IWQM Strategy - Edition 1</i>				
Task 4.3: Development of the IWQM Strategy -Final	R 139 019	R 19 463	R 158 482	
<i>Deliverable 4c: IWQM Strategy - Edition 2</i>				
COMPONENT 5: CONVERTING POLICY INTO PRACTICE				R 1 181 870
Task 5.1: Development of the Implementation Plan	R 376 278	R 52 679	R 428 957	
<i>Deliverable 5a: Implementation Plan - Edition 1</i>	R 300 944	R 42 132	R 343 076	
<i>Deliverable 5b: Implementation Plan - Edition 2</i>	R 75 334	R 10 547	R 85 881	
Task 5.2: Monitoring and Evaluation Framework	R 323 442	R 45 282	R 368 724	
<i>Deliverable 5c: Note on the M&E Framework</i>	R 263 416	R 36 878	R 300 294	
<i>Deliverable 5d: M&E Framework - Edition 1 (Final)</i>	R 60 026	R 8 404	R 68 430	
Task 5.3: WQM Organisational Design	R 337 008	R 47 181	R 384 189	
<i>Deliverable 5e: Note on WQM Organisational Design</i>	R 181 200	R 25 368	R 206 568	
<i>Deliverable 5f: WQM Organisational Report - Edition 1 (Final)</i>	R 155 808	R 21 813	R 177 621	
COMPONENT 6: STAKEHOLDER CONSULTATION AND COMMUNICATION				R 3 178 236
Task 6.1: Identification of the Stakeholder Groups	R 203 649	R 28 511	R 232 160	
<i>Deliverable 6a: Note on the stakeholder groups</i>				

	Task total	14% VAT	Total Task Cost	Component Cost
	Excl. VAT		Incl. VAT	Incl. VAT
Task 6.2: Stakeholder Engagement and Communication Strategy	R 308 210	R 43 149	R 351 359	
<i>Deliverable 6b: Stakeholder Engagement and Communication Strategy - Edition 1</i>				
Task 6.3: Stakeholder Engagements	R 1 511 098	R 211 554	R 1 722 652	
<i>Deliverable 6c: Provincial Road Show 1</i>	R 128 960	R 18 054	R 147 014	
<i>Deliverable 6d: Provincial Road Show 2</i>	R 128 960	R 18 054	R 147 014	
<i>Deliverable 6e: Provincial Road Show 3</i>	R 128 959	R 18 054	R 147 014	
<i>Deliverable 6f: Provincial Road Show 4</i>	R 128 960	R 18 054	R 147 014	
<i>Deliverable 6g: Provincial Road Show 5</i>	R 128 960	R 18 054	R 147 014	
<i>Deliverable 6h: Provincial Road Show 6</i>	R 128 960	R 18 054	R 147 014	
<i>Deliverable 6i: Provincial Road Show 7</i>	R 128 960	R 18 054	R 147 014	
<i>Deliverable 6j: Provincial Road Show 8</i>	R 128 960	R 18 054	R 147 014	
<i>Deliverable 6k: Provincial Road Show 9</i>	R 128 960	R 18 054	R 147 014	
<i>Deliverable 6l: National WQM Workshop</i>	R 128 960	R 18 054	R 147 014	
<i>Deliverable 6m: WQM Symposium</i>	R 221 500	R 31 010	R 252 510	
Task 6.4: Communication Tools	R 661 201	R 92 568	R 753 769	
<i>Deliverable 6n: Newsletter 1 - WQM Status Quo</i>	R 44 506	R 6 231	R 50 737	
<i>Deliverable 6o: Newsletter 2 - WQM Policy</i>	R 44 506	R 6 231	R 50 737	
<i>Deliverable 6p: Newsletter 3 - IWQM Strategy</i>	R 44 506	R 6 231	R 50 737	
<i>Deliverable 6q: Newsletter 4 - Implementation, M&E</i>	R 44 506	R 6 231	R 50 737	
<i>Deliverable 6r: Project Information Management Database</i>	R 80 000	R 11 200	R 91 200	
<i>Deliverable 6s: IWQM web page</i>	R 60 000	R 8 400	R 68 400	
<i>Deliverable 6t: DWS IWQM Banners</i>	R 5 000	R 700	R 5 700	
<i>Deliverable 3d: Summary of WQM Policy</i>	R 55 000	R 7 700	R 62 700	
<i>Deliverable 3e: WQM Policy Brochure</i>	R 55 000	R 7 700	R 62 700	
<i>Deliverable 4d: Summary of IWQMS</i>	R 55 000	R 7 700	R 62 700	
<i>Deliverable 4e: IWQMS Brochure</i>	R 55 000	R 7 700	R 62 700	
<i>Deliverable 5g: Concept Work Plans</i>	R 118 177	R 16 545	R 134 722	
Task 6.5: Stakeholder Engagement Audit Report	R 103 768	R 14 528	R 118 296	
<i>Deliverable 6u: Stakeholder Audit Report and Database - Edition 1</i>				

	Task total	14% VAT	Total Task Cost	Component Cost
	Excl. VAT		Incl. VAT	Incl. VAT
COMPONENT 7: CAPACITY BUILDING				R 612 569
Task 7.1: Development of Capacity Building Strategy	R 137 068	R 19 189	R 156 257	
<i>Deliverable 7a: CBS Report - Edition 1</i>				
Task 7.2: Development of training tools	R 102 816	R 14 394	R 117 210	
<i>Deliverable 7b: Training Toolkit</i>				
Task 7.3: Capacity Building of key DWS Personnel	R 297 458	R 41 644	R 339 102	
<i>Deliverable 7c: CB Audit Report - Edition 1</i>				
Task 7.4: Capacity Building of HDE/HDI	R 0	R 0	R 0	
COMPONENT 8: PROJECT MANAGEMENT AND ADMINISTRATION				R 633 384
Task 8.1: Project management and administration	R 555 600	R 77 784	R 633 384	
<i>Deliverable 8a: Quarterly Report 1</i>	R 69 450	R 9 723	R 79 173	
<i>Deliverable 8b: Quarterly Report 2</i>	R 69 450	R 9 723	R 79 173	
<i>Deliverable 8c: Quarterly Report 3</i>	R 69 450	R 9 723	R 79 173	
<i>Deliverable 8d: Quarterly Report 4</i>	R 69 450	R 9 723	R 79 173	
<i>Deliverable 8e: Quarterly Report 5</i>	R 69 450	R 9 723	R 79 173	
<i>Deliverable 8f: Quarterly Report 6</i>	R 69 450	R 9 723	R 79 173	
<i>Deliverable 8g: Quarterly Report 7</i>	R 69 450	R 9 723	R 79 173	
<i>Deliverable 8h: Quarterly Report 8</i>	R 69 450	R 9 723	R 79 173	
COMPONENT 9: PROJECT CLOSURE				R 242 560
Task 9.1: SCM close-out report	R 94 248	R 13 195	R 107 443	
<i>Deliverable 9a: SCM close-out report</i>				
Task 9.2: Technical Closure report	R 118 524	R 16 593	R 135 117	
<i>Deliverable 9b: Technical close-out report</i>				
Total Professional Time	R 7 263 412	R 1 016 878	R 8 280 290	R 8 280 290

9.1.1 HDI Budget

The HDI component of the project team in terms of professional fee expenditure is:

Table 10: Budget breakdown according to race and gender

HDI category	HDI project value	% project value
Black Male	R 496 200	8
Black Female	R 2 535 200	40
White Female	R 478 300	8
White Male	R 2 830 100	45
TOTAL PROJECT PERSONNEL COST	R 6 339 800	
Black total	R 3 031 400	48
Female total	R 3 013 500	48

9.2 Project Invoicing Schedule

The project contract stipulates that the project will be invoiced on a deliverables basis. As such, the schedule of payment for the deliverables is presented below.

9.2.1 Summarised Invoicing Schedule

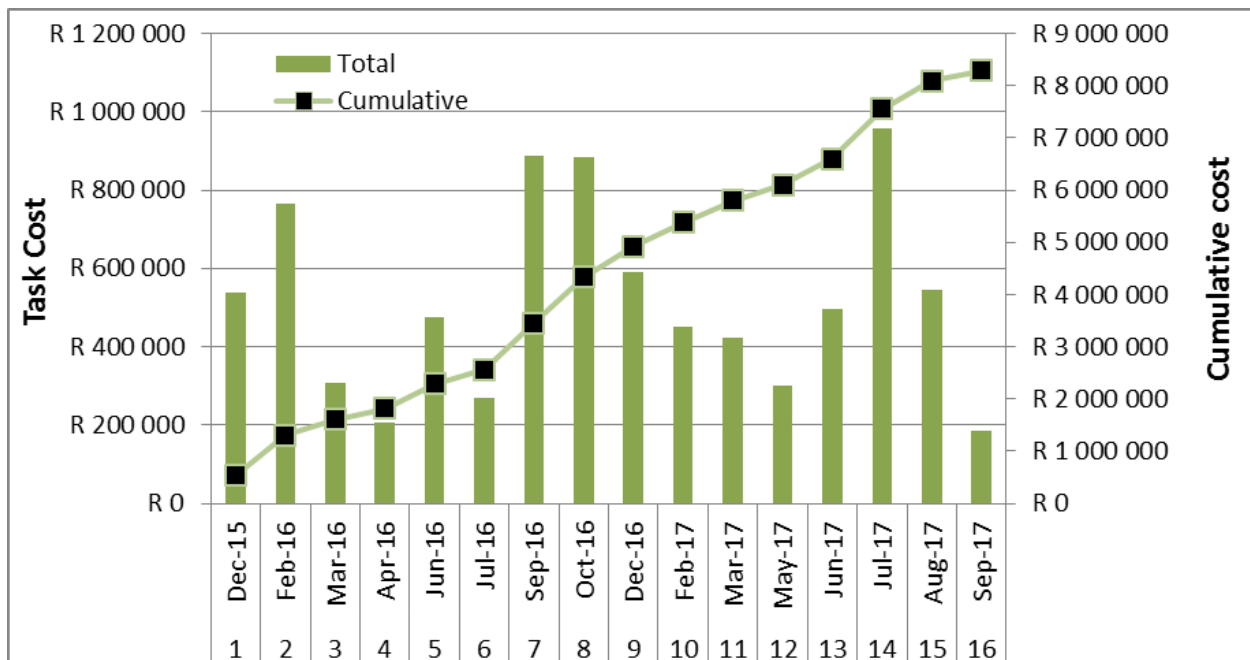


Figure 5: Project cash flow

The timing of invoices is provided the table below.

Table 11: Invoice scheduling

Invoice No.	Date	Total
1	Dec-15	R 539 902
2	Feb-16	R 764 144
3	Mar-16	R 309 346
4	Apr-16	R 205 013
5	Jun-16	R 476 552
6	Jul-16	R 270 944
7	Sep-16	R 886 802
8	Oct-16	R 882 086
9	Dec-16	R 588 987
10	Feb-17	R 450 683
11	Mar-17	R 422 249
12	May-17	R 300 294
13	Jun-17	R 495 773
14	Jul-17	R 955 776
15	Aug-17	R 545 122
16	Sep-17	R 186 616
TOTAL		R 8 280 290

9.2.2 Detailed Invoicing Schedule

A detailed breakdown of invoicing for the project is provided in Table 12 below.

Table 12: Detailed invoice schedule per deliverable

Inv No.	Date	Deliverables	Task Cost	Total
1	Dec-15			R 539 902
		Deliverable 1a: Inception Report- Edition 1	R 304 472	
		Deliverable 7a: CBS Report - Edition 1	R 156 257	
		Deliverable 8a: Quarterly Report 1	R 79 173	
2	Feb-16			R 764 144
		Deliverable 2a: Literature Review - Inaugural Report	R 83 749	
		Deliverable 2d: Note on WQ and WQM in SA	R 315 452	
		Deliverable 2f: Glossary - Inaugural Report	R 13 584	
		Deliverable 6b: Stakeholder Consultation and Communication Strategy - Edition 1	R 351 359	
3	Mar-16			R 309 346
		Deliverable 2e: WQ and WQM in SA - Edition 1 (Final)	R 179 436	
		Deliverable 6n: Newsletter 1 - WQM Status Quo	R 50 737	
		Deliverable 8b: Quarterly Report 2	R 79 173	
4	Apr-16			R 205 013
		Deliverable 3a: Note on the WQM Policy Principles	R 205 013	
5	Jun-16			R 476 552
		Deliverable 3b: WQM Policy - Edition 1	R 346 642	
		Deliverable 6o: Newsletter 2 - WQM Policy	R 50 737	
		Deliverable 8c: Quarterly Report 3	R 79 173	

Inv No.	Date	Deliverables	Task Cost	Total
6	Jul-16			R 270 944
		Deliverable 4a: Note on the Strategic Approach	R 270 944	
7	Sep-16			R 886 802
		Deliverable 4b: IWQM Strategy - Edition 1	R 360 886	
		Deliverable 6c: Provincial Road Show 1	R 147 014	
		Deliverable 6d: Provincial Road Show 2	R 147 014	
		Deliverable 6e: Provincial Road Show 3	R 147 014	
		Deliverable 8d: Quarterly Report 4	R 79 173	
		Deliverable 6t: DWS IWQM Banners	R 5 700	
8	Oct-16			R 882 086
		Deliverable 6f: Provincial Road Show 4	R 147 014	
		Deliverable 6g: Provincial Road Show 5	R 147 014	
		Deliverable 6h: Provincial Road Show 6	R 147 014	
		Deliverable 6i: Provincial Road Show 7	R 147 014	
		Deliverable 6j: Provincial Road Show 8	R 147 014	
		Deliverable 6k: Provincial Road Show 9	R 147 014	
9	Dec-16			R 588 987
		Deliverable 5e: Note on WQM Organisational Design	R 206 568	
		Deliverable 6l: National WQM Workshop	R 252 510	
		Deliverable 6p: Newsletter 3 - IWQM Strategy	R 50 737	
		Deliverable 8e: Quarterly Report 5	R 79 173	
10	Feb-17			R 450 683
		Deliverable 3c: WQM Policy - Edition 2	R 145 187	
		Deliverable 4c: IWQM Strategy - Edition 2	R 158 482	
		Deliverable 6m: WQM Symposium	R 147 014	
11	Mar-17			R 422 249
		Deliverable 5a: Implementation Plan - Edition 1	R 343 076	
		Deliverable 8f: Quarterly Report 6	R 79 173	
12	May-17			R 300 294
		Deliverable 5c: Note on the M&E Framework	R 300 294	
13	Jun-17			R 495 773
		Deliverable 2b: Literature Review - Edition 1 (Final)	R 36 024	
		Deliverable 2c: Literature database	R 3 135	
		Deliverable 2g: Glossary - Edition 1 (Final)	R 8 664	
		Deliverable 5b: Implementation Plan - Edition 2	R 85 881	
		Deliverable 6a: Note on the stakeholder groups	R 232 160	
		Deliverable 6q: Newsletter 4 - Implementation, M&E	R 50 737	
		Deliverable 8g: Quarterly Report 7	R 79 173	
14	Jul-17			R 955 776
		Deliverable 5d: M&E Framework - Edition 1 (Final)	R 68 430	
		Deliverable 5f: WQM Organisational Report - Edition 1 (Final)	R 177 621	
		Deliverable 6u: Stakeholder Audit Report and Database - Edition 1	R 118 296	
		Deliverable 7b: Training Toolkit	R 117 210	
		Deliverable 7c: CB Audit Report - Edition 1	R 339 102	
		Deliverable 9b: Technical close-out report	R 135 117	

Inv No.	Date	Deliverables	Task Cost	Total
15	Aug-17			R 545 122
		Deliverable 6r: Project Information Management Database	R 91 200	
		Deliverable 6s: IWQM web page	R 68 400	
		Deliverable 3d: Summary of WQM Policy	R 62 700	
		Deliverable 3e: WQM Policy Brochure	R 62 700	
		Deliverable 4d: Summary of IWQMS	R 62 700	
		Deliverable 4e: IWQMS Brochure	R 62 700	
		Deliverable 5g: Concept Work Plans	R 134 722	
16	Sep-17			R 186 616
		Deliverable 8h: Quarterly Report 8	R 79 173	
		Deliverable 9a: SCM close-out report	R 107 443	
TOTAL INVOICE				R 8 280 290

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APPENDIX A:

PROJECT GOVERNANCE STRUCTURES



WATER QUALITY MANAGEMENT POLICIES AND STRATEGIES FOR SOUTH AFRICA (PROJECT WP 10978)

TERMS OF REFERENCE FOR THE PROJECT GOVERNANCE STRUCTURES

1. BACKGROUND INFORMATION

- 1.1 The Department of Water and Sanitation (DWS) has a mandate to manage the water resources of South Africa in such a way as to protect the resource whilst enabling the sustainable development of the resource. The challenge the Department faces is finding this balance whilst supporting the economic and social upliftment of the country.
- 1.2 It is clear that whilst water quality management (WQM) remains to be a core element of national water resource management policy, and is importantly reflected in the National Water Resource Strategy (version 2), that the resources and political emphasis that is directed towards WQM is not nearly enough to support the necessary management regime. In the face of a developing economy the need for a renewed approach towards WQM is critical if we are to manage our resources sustainably.
- 1.3 It is recognised that the existing WQM policy is dated (Water Quality Management Policies and Strategies in the RSA, 1991) and whilst innovative at the time of publication is now in need of revision in order to align with current overarching policy and legislative frameworks. Key amongst these issues is fundamental changes in governance and institutional frameworks and the need to consider more carefully the role of various public and private actors. It is recognised that there is a range of supporting operational policies, strategies, management instruments and methodologies that have been developed and implemented in more recent years. These provide a significant platform from which the new strategies and policies can be developed, based upon the pragmatic experience of implementing these instruments.
- 1.4 Critically important the policy needs to formalise the Department's position with regards to WQM. In so doing the policy needs to be appropriate for the current context, yet forward looking considering aspects such as socio-economic development and the challenges of climate change. Clearly, this policy needs to be aligned to existing framework policy in the Department as well as broader government, and in so doing needs to carefully consider the need for vertical and horizontal integration between the various existing policy instruments.
- 1.5 The strategy becomes the route map to give effect to the WQM policy and must articulate the broader process of WQM, providing roles and responsibilities. It will be essential that the strategy outline the national approach to the differing dimensions of WQM and should include such aspects as water quality objectives; thematic issues such as nutrient enrichment, salinization and Acid Mine Drainage; regulation and regulatory instruments; monitoring; financial aspects; institutional and governance aspects; communications and capacity building. As with the policy, the strategy does need to be looking to the challenges of the future and should therefore articulate strategies to arising issues such as water quality off-setting, the use of buffer zones,

and the management of complex organic compounds, as well as key institutional shifts that will see the possibly increasing engagement of the private sector through Public-Private Partnerships. Alignment with the National Water Resource Strategy and other key governmental strategies is critical.

- 1.6 In developing the implementation (policy into practice) plans it is critical to align this plan with a range of planning instruments that exist in the Department. The plan needs to be very clear with regards to roles and responsibilities, financial elements, linkages and dependencies between key activities, as well as key measures and indicators that allow progress to be monitored and evaluated.

2. PROJECT GOVERNANCE STRUCTURES

- 2.1 In order to develop policy, strategy and an implementation plan that involves a wide range of stakeholders, both external and internal to the Department, the Directorate: Water Resource Planning Systems is proposing a layered management structure to ensure that decision making and guidance are provided at the appropriate levels and in an efficient manner, whilst providing an opportunity for engagement and debate that can create a sense of ownership of the instruments that are developed.
- 2.2 The project management structure is described below and follows a three tiered approach. This approach allows for 1) effective and rapid day to day management and administration by DWS 2) inclusive management which allows for decisions to be influenced and made by DWS and the CMA WQM line-function personnel and 3) inclusive management that allows for the project to receive strategic direction from key external stakeholders
- 2.3 A Project Administration Committee (PAC) will be established to manage the day to day functioning of the project and will consist of the project manager, deputy manager and project coordinator from the Directorate: Water Resources Planning Systems and the consultant project team. Typically the PAC will meet on a monthly basis and will have the following broad responsibilities:
- Manage the day-to-day administrative requirements of the project.
 - Be the link between DWS and the project team.
 - Provide technical advice and guidance to the project.
 - Coordinate the actions from this project with other parallel actions, activities and studies that may have a bearing on the project or the overall process.
 - Coordinate engagement by the project team with external stakeholders.
 - Make decisions on the appropriate level regarding the deliverables and outcomes of the project.
 - Approve the deliverables of the project.
 - Finalise reporting.
 - Make recommendations to the relevant DWS Managers.
 - Serve as a contact point and coordination mechanism with other related actions that may impact on the project and *vice versa*.
- 2.4 The Project Management Committee (PMC) will be established at the more managerial level and will provide a platform for managerial and technical inputs into the policy, strategy and implementation plan development. This committee will provide inputs from Head Office, the Provincial Offices and Catchment Management Agencies, and will have the opportunity to provide pragmatic insights with the understanding that many of the line functions present at the PMC will have responsibilities to implement

and oversee the various outcomes of this project, or will have the way in which their line functions operate impacted upon by the various policy, strategy and implementation elements. The PMC will in addition provide an opportunity for exchange and the building of capacity noting the various operational and strategic outcomes that will emerge from the project.

2.5 The PMC members will be drawn from the CMAs and WQM Line functions within DWS and will be chaired by the Director: Water Resources Planning Systems. The PMC will convene at key milestones during the project. The responsibilities of the PMC are:

- Ensure alignment with the national government objectives and current strategic projects including the National Water Resource Strategy, the Legislative Review and Institutional Reforms and Realignment.
- Provide both strategic direction as well as guidance on the various technical dimensions of the project.
- Provide inputs (written and verbal) regarding the practical implications of the revised policy, strategy and implementation plans.
- Provide inputs regarding the revised policy, strategy and implementation plans that have significant reference to their line functions or provincial offices or CMA.
- Ensure integration, consistency, cohesion and coordination of the project in all WMAs.
- Exchange of experience between line functions and regions, as well as institutions.
- Provide support and advice to the PSC on their deliberations.
- Support the provincial road shows and any specific stakeholder focus groups that are relevant to the line function, provincial office or CMA.

2.6 The Project Steering Committee (PSC) will be established in order to provide more strategic guidance and will provide a platform for the consideration of key inter-Departmental and cross-sectoral implications of the policy, strategy and implementation plan. The PSC will consist of representatives from DWS and other Government Departments (for example DMR, DEA, NT, DoA). The PSC may invite external specialists to be part of their deliberations, if so required. Due to the more strategic nature of the PSC this committee will be drawn from the more senior Departmental echelons. Due to size considerations, relevant external stakeholders (such as key Public Institutions, sector associations (such as the Chamber of Mines, AgriSA etc) and NGO's, the various water management institutions (CMA's, WUA's) and key water service providers (Randwater, MidVaal, Sedibeng Water etc) will not form part of the PSC. They will however be invited to the various other platforms that form part of the project, including the stakeholder workshops which will be held at each of the four Key Milestones in the Project.

2.7 The PSC will be chaired by the Chief Director: Integrated Water Planning and will meet at key milestones during the project cycle. These meetings will be structured around key deliverables and outcomes from the project. The responsibilities of the PSC are:

- Provide strategic direction, vision and guidance in the conceptualisation and finalisation of key areas and outputs of the project.
- Provide strategic linkages to other policies and strategies, as relevant.
- Guide in terms of inter- and intra-governmental coordination.
- Provide inputs (written and verbal) regarding the strategic implications of the revised policy, strategy across Departments and sectors.

- Review the strategic challenges as well as request support in terms of policy decisions required.
- Review progress made.

3. PROPOSED MEMBERS OF THE PROJECT COMMITTEES

- 3.1 It is understood that the membership of these management structures may require some fluidity noting that individuals do change roles and responsibilities over time, as well as that staff commitments can alter availability of members. As such, **in order to support the development of solid policy and strategy instruments, the engagement of the key internal and external stakeholders is imperative, and consistent participation by the members of the committees is equally important.** It is recognised that at this early juncture that there will be some adjustments in the membership of the various committees.
- 3.2 The proposed list of representatives to serve on the PMC and PSC are provided in the Appendices. This initial list will be revised and improved during the course of the project. At this stage these lists are focused on DWS and CMA membership. The PSC will include external stakeholders and this list will be developed within the coming work period.

4. SECRETARIAT

- 4.1 Secretariat for the various governance structures will be provided by the project team.

DEVELOPMENT OF AN INTEGRATED WATER QUALITY MANAGEMENT (IWQM) STRATEGY

(WP10978)

PROJECT GOVERNANCE STRUCTURES

Project Committee Members as identified at the completion of the Inception Report include:

Project Administrator Committee

Name	Position	Role
Pieter Viljoen	Department of Water Affairs and Sanitation (DWS): Water Quality Planning (WQP)	Chairman / Project Manager
Jacqueline Jay	DWS: WQP	Member / Project co-ordinator
Jurgo van Wyk	DWS: WQP	Member / Deputy Project Manager
Derek Weston	Pegasys Strategy and Development	Project Team
Traci Reddy	Pegasys Strategy and Development	Project Team
Robyn Arnold	Write Connection	Project Secretariat

Project Management Committee

Name	Surname	Position
Siboniso	Mkhaliphi	Compliance Monitoring (Agricultural Processing)
Namisha	Muthraparsad	Compliance Monitoring (Industry)
Collen	Morodi	Economic and Social Regulation
Solomon	Makate	Water Services Regulation: Waste Water (Green Drop)
Mary	Mupariwa	Water Sector Support (Regulation)
Sipho	Skosana	Water Allocation
Wietsche	Roets	WA&IU: Environment and Recreation
Kganetsi (Willie)	Mosefowa	Resource Protection and Waste
Thivafuni	Nemataheni	Resource Protection and Waste (Mines)
Malise	Noe	Resource Protection and Waste
Tsunduka	Khosa	Water Use Administration
Thandi	Mopai	Enforcement: Administration Support
Magda	Ligthelm	Policy and Strategy Co-ordination: Strategy
Hlalanathi (Nathi)	Fundzo	Policy and Strategy Co-ordination: Policy
Eustathia	Bofilatos	Water Management Institutional Governance
Yakeen	Atwaru	Water Ecosystems: Reserve Determination
Barbara	Weston	Water Ecosystems: Surface Reserve Determination
Thapelo	Machaba	Water Ecosystems: Surface Reserve Determination
Tovhowani	Nyamande	Information Programmes
Fhedzisani	Ramusiya	W.A.R.M.S
Gerhard	Cilliers	Resource Quality Information Services
Niel	van Wyk	National Water Resource Planning
Beason	Mwaka	Water Resource Planning Systems
Fanus	Fourie	Integrated Hydrological Planning (Ground Water)
Rodrick	Schwab	Economic and Environmental Studies
Pieter	Viljoen	Water Quality Planning
Jackie	Jay	Water Quality Planning: Central

Name	Surname	Position
Jurgo	van Wyk	Water Quality Planning: Central
Geert	Grobler	Water Quality Planning: East
Lebo	Mosoa	Water Quality Planning: North
Paul	Herbst	Water Use Efficiency
Lethabo	Ramashala	North West Provincial Operations Office
Bashan	Govender	Gauteng Provincial Operations Office
Renelle	Pillay	KZN Provincial Operations Office
Donald (Hangwani)	Mabada	Limpopo Provincial Operations Office
Stanford	Macevele	Mpumalanga Provincial Operations Office
Gawie	van Dyk	Northern Cape Provincial Operations Office (Kimberley)
Landile	Jack	Eastern Cape Provincial Operations Office
Melissa	Lintnaar-Strauss	Western Cape Provincial Operations Office
Marcus	Selepe	Inkomati Usuthu CMA
Jan	van Staden	Breede Overberg CMA
Guy	Pegram	Project Team - Pegasys
Nico	Rossouw	Project Team - Pegasys
Derek	Weston	Project Team - Pegasys
Traci	Reddy	Project Team - Pegasys
Robyn	Arnold	Project Team secretariat
Mike	Warren	Water Services and Local Water Management
Ephraim	Mokoena	Gauteng
Siboniso	Ndlovu	Urban and Rural Water Management
Allestair	Wensley	Water Services and Local Water Management
Darryl	Daniels	Catchment manager, Berg River, Western Cape
Sebastian	Jooste	Resource Quality Information Services

Project Steering Committee (PSC)

Only the DWS and CMA members of the PSC are listed here. Additional members would include representatives from representatives from other Government Departments (DMR, DEA, DAFF, NT).

Name	Surname	Position
Anet	Muir	Compliance Monitoring
Sizani	Moshidi	Economic and Social Regulation
Lerato	Mokoena	Water Services Regulation
Marie	Brisley	Policy and Strategy Co-ordination
Thoko	Sigwaza	Water Management Institutional Governance
Ndileka	Mohapi	Water Ecosystems
Moloko	Matlala	Information Programmes
Beason	Mwaka	Water Resource Planning Systems
Pieter	Viljoen	Water Quality Planning
Jackie	Jay	Water Quality Planning: Central
Jurgo	van Wyk	Water Quality Planning: Central
Seef	Rademeyer	National Water Resource Planning: Central
Paul	Herbst	Water Use Efficiency
Fred	van Zyl	Macro Planning

Name	Surname	Position
Peet	Venter	North West Provincial Operations Office
Marius	Keet	Gauteng Provincial Operations Office
Andrew	Lucas	Eastern Cape Provincial Operations Office
Doris	Maumela	Limpopo Proto-CMA
Wendy	Ralekoa	Olifants Proto-CMA
Jay	Reddy	Pongola-Umzimkulu Proto-CMA
Konanani	Khorommbi	Vaal Proto-CMA
Moses	Mahunonyane	Orange Proto-CMA
Maxwell Serenya	Serenya	Mzimvubu-Tsitsikamma Proto-CMA
Ashia	Petersen	Berg-Olifants Proto-CMA
Thomas	Gyedu-Ababio	Inkomati Usuthu CMA
Phakamani	Buthelezi	Breede Overberg CMA
Jan	van Staden	Breede Overberg CMA
Guy	Pegram	Project Team - Pegasys
Barbara	Schreiner	Project Team Pegasys
Andre	Gorgons	Project Team Aurecon
Derek	Weston	Project Team - Pegasys
Traci	Reddy	Project Team - Pegasys

APPENDIX B:

PROJECT

TERMS OF REFERENCE

DEVELOPMENT OF AN INTEGRATED WATER QUALITY MANAGEMENT STRATEGY

Terms of Reference:
REQUEST FOR PROJECT PROPOSALS

(WP10978)

April 2015



water & sanitation

Department:
Water and Sanitation
REPUBLIC OF SOUTH AFRICA

Sub-Directorate Water Quality Planning

**Directorate Water Resource Planning Systems,
Chief Directorate Integrated Water Resource Planning,
Department of Water and Sanitation,
Private Bag X313,
Pretoria, 0001**

Republic of South Africa

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1. INTRODUCTION

Water Quality Management (WQM), as we know it today, has evolved from a pollution control approach that was initially primarily reliant on the enforcement of uniform effluent standards to the current approach where resource planning and management efforts are complemented by appropriate source controls and remedial efforts, within the context of Integrated Water Resource Management (IWRM). The water law review in 1998, for the first time, introduced the legal means to implement most modern-day Integrated Water Quality Management (IWQM) imperatives. However, implementation, in many respects, is hampered by the lack of suitable supporting strategic and operational direction; this being the focus of the proposed project contract.

2. BACKGROUND

2.1 Water Quality in South Africa

Constant media claims, in many cases backed by scientific evidence, frequently raise concerns about the deterioration over time of the water quality in many of our water resources. Resource water qualities that are unfit for use are being reported with increasing frequency, particularly with regards to the presence of toxicants, microbial contamination, salinisation and nutrient enrichment. In 2011, the Department, through an assessment of over 1000 monitoring sites nationally, showed that water quality across the country was declining, with 71% of the sites exceeding the objectives for phosphate and 30% exceeding the limits for salts (as Electrical Conductivity). Only 17% of the monitoring points assessed at a national scale met all the resource water quality objectives for all water quality variables.

According to this study, the main sources of pollution that have a negative impact on water quality are:

- discharges of urban and industrial effluents to the environment;
- irrigation return flows;
- discharges, wash off and leachate from mining operations; and
- wash off from areas of human settlement with inadequate sanitation.

The effects of these sources of pollution and the resulting poor instream water quality are felt by all water users, particularly by water suppliers, local communities, businesses, agriculture, tourism, and vulnerable populations.

In addition to the above impacts on water users, poor water quality compromises the ecological integrity of freshwater resources. This compounds the impacts on users who are reliant on ecological infrastructure, minimises the potential for water resources to provide services for future generations and compromises national development and biodiversity conservation goals. Such scenarios must be remedied and avoided, since they potentially pose adverse human health effects, whilst also jeopardizing sustainable development. Although the mandate to achieve this lies with the Department of Water and Sanitation (DWS), the aims of IWQM cannot be realised without alignment and the participation of other government departments and the water sector at large. This concept is recognised in the second version of the National Water Resource Strategy (NWRS-2) and future Water Quality Management (WQM) activities should aim to achieve the various water quality related strategic actions contained throughout the strategy.

2.2 Water Quality Management Structures and Integration

Integrated water quality management considers the collective impact of land use and water use processes with the intention to reduce pollution within environmentally sustainable limits using IWRM principles. This implies that co-ordinated planning and action is required at all levels, from national government through provincial and local authorities to individual landowners. It

should not only incorporate all the elements of the hydrological cycle, integrate water resource planning and management efforts in respect of water quality, water quantity and aquatic ecosystem integrity (habitat and biota) and link resource and source directed measures but also align water resource and water sanitation frameworks (catchment to consumer to catchment concept), enable integrated decision making and consider the links between society and the bio-physical environment.

Given that WQM constitutes an effort that is serviced and maintained by various different role-players that fulfil specific functions at various scales, identification of the roles and responsibilities and the linkages between these role-players both within and external to the DWS forms a key aspect of achieving IWQM. The capacity of these role players to fulfil their mandates and the actions required to improve performance should similarly also be identified. Such an approach will ensure that strategic actions, requirements for integrated planning, co-operative governance, communication, stewardship and management processes are more clearly defined in the interest of more efficient and effective co-operation and execution of WQM functions and mandates.

2.3 Existing Water Quality Management Instruments

Policy specifies intent, while strategy is action orientated. Both policy and strategy, therefore, are required at the appropriate resolution in order to provide clear guidance to the execution of the water sector's WQM functions in order to facilitate the desired level of water resource protection.

The development of an operational WQM Policy and IWQM Strategy which addresses the requirements of the NWRS-2 and the need to improve WQM in South Africa should be based on the improvement and, where required, the integration and/or alignment of existing policies and strategies. This includes but is not limited to the following:

- DWAF, 1991. Water Quality Management Policies and Strategies in the RSA;
- DWAF, 2000. Policy and Strategy for Groundwater Quality Management in SA;
- DWAF, 2006. Resource Directed Management of Water Quality: Volume 1.2: Policy;
- DWAF, 2006. Resource Directed Management of Water Quality: Volume 2.2: Strategy.

The current WQM policy entitled "*Water Quality Management Policies and Strategies in the RSA*" dates back to 1991 to the time when pollution control had been expanded into the management of water quality in South Africa. This was developed as an overarching policy for WQM and as such contained both resource and source directed aspects. Although the particular document was, in many respects, lauded as innovative and ground-breaking, it had been published prior to the promulgation of the current water legislation, and hence, does not contain operational policy and strategy that harmonise with today's legislation, executive policy and management imperatives. Another gap in the 1991 document, that warrants revision, would be the governance strategies that applied back then. Since the role-players in WQM had largely changed since then, addressing the changes in WQM roles and responsibility at the level of operational policy and strategy will benefit departmental functional integration. Attention should also be given to the working relationships with the CMAs/ proto-CMAs/ Provincial Offices, and other water institutions.

Following on from the 1991 WQM policy, a series of operational "*Resource Directed Management of Water Quality*" (RDMWQ) policy, strategy, management instruments and methodologies have been developed and implemented over the past few years. These are extensively being utilised *inter alia* by DWS technical specialists, universities, water practitioners and professional service providers that conduct studies for the Department. The 2006 RDMWQ policy and strategy constitutes an update of the resource directed aspects of the 1991 policy.

Other thematic/ sector specific strategies and guidelines that have been developed to direct WQM in South Africa include, but are not limited to:

- DWAF, 1995. Procedures to Assess Effluent Discharge Impacts;
- DWAF, 1999. A strategic Plan for the Department of Water Affairs and Forestry to Facilitate the Implementation of Catchment Management in South Africa;
- DWAF, 1999. National Strategy for Managing the Water Quality Effects of Settlements;
- DWAF, 2003. Conceptual Introduction to the Nature and Content of the Water Quality Management and Assessment Components of a Catchment Management Strategy;
- WRC, 2006. Guidelines for the Utilisation and Disposal of Wastewater Sludge;
- DWAF, 2008. Mining Best Practice Guidelines (A-H); and
- DWA, 2010. Operational Guideline for Best Eutrophication Management Practices.

The above management instruments may contain a number of gaps and areas requiring improvement, and as such a gaps analysis, based on a review of WQM approaches and instruments as well as on recommendations from previous studies and stakeholder inputs, will form part of the project scope.

Whereas the gaps identified for the policy and strategy will need to be addressed in this project, gaps in existing thematic/sector strategies and guidelines and any new studies, models, research, guidelines and sub-strategies, *etc.* will need to be identified and described in this project as part of the actions to be addressed in the strategy. The strategy will also need to provide input to the next version of the NWRS, in 2018.

In the development of the revised policy, strategy and WQM actions it will be essential that the root causes of water quality deterioration be identified and addressed in a structured and systematic manner and should include technical, institutional and governance aspects.

2.4 Policy Hierarchy

Distinction is made in this project between **executive** and **operational** policy and strategy. Operational policy and strategy are necessary to provide sufficient resolution to enable consistent and effective implementation of executive policy and strategy. The *White Paper on a National Water Policy for South Africa, 1997* (and the subsequent policy reviews) as well as the *National Water Resource Strategy* (NWRS) are examples of executive policy and strategy, respectively. In the absence of suitable guiding operational policy and strategy, and supporting management instruments, gaps are created that may potentially lead to an implementation vacuum in respect of certain high level policy imperatives. In addition, it is also important to note that the emphasis is on implementability and implementation and not on the creation of academic reference material *per se*. The deliverables coming forth shall provide a clear basis for improved planning and management of water quality, with implementation as key driver.

The proposed management instruments, to be established as part of this project, will relate to one another, as well as to other existing management instruments in the Department in a specific hierarchy. The said hierarchy of instruments is to stand under the “*umbrella*” of applicable executive policy and strategy.

3. SCOPE OF WORK

The project goal, objectives, focus, structure and time are defined below in the context of the background provided above.

3.1 Project Goal

The goal of the project contract is to-

develop a WQM Policy and IWQM Strategy which provides the necessary guidance to the Department, as well as the larger water sector, for the effective, sustainable and integrated management of South Africa's surface and ground water quality.

3.2 Project Objectives

The main objectives in support of the of the project goal is to-

- identify the current water quality, WQM and integration challenges and the causes of these challenges;
- review relevant national and international WQM related information and identify gaps in current WQM approaches, instruments and practices in South Africa at all levels (local, regional, national), for both government and the water sector at large;
- review, update and formalise the Departmental WQM policy and IWQM strategy. The IWQM strategy must include current management imperatives, as well as changes to water and related environmental legislation made over recent years;
- include mechanisms and actions for the Department to facilitate and monitor the roll-out of the strategy and ensure co-ordination between the various role-players with the aim of developing and giving effect to the IWQM Strategy;
- capacitate and consult a wide group of stakeholders on IWQM concepts and principles and on the project and it's outcomes; and
- ensure accurate and efficient feedback and communication with regard to the development of the IWQM Policy and Strategy.

3.3 Project Focus

The project focus is to include-

- rivers, dams, aquifers, wetlands and estuaries;
- perennial and non-perennial systems;
- trans-boundary systems;
- water quality in all its aspects (biological, physical, chemical, aesthetic, toxicological etc.);
- water quantity, instream and riparian habitat and biota, in so far as it relates to water quality; and
- water quality in the context of IWRM and water services provision.

3.4 Project Structure and Priorities

In order to provide the necessary structure to project execution, a phased approach towards addressing the project goal is proposed. As a result of the intertwined nature of several of the project aspects, project phases may overlap, and if necessary run concurrently.

It is foreseen that the proposed project is to include the following distinct components:

- | | |
|-------------|---|
| Component 1 | Project Inception; |
| Component 2 | Situation assessment and gaps analysis; |
| Component 3 | Development of a WQM Policy; |
| Component 4 | Development of an IWQM Strategy; |
| Component 5 | Converting Policy into Practice; |
| Component 6 | Stakeholder Consultation and Communication; |
| Component 7 | Project Management and Administration; and |
| Component 8 | Project Closure. |

The nature of the individual project phases needs to be clearly set out within the Project Proposal to be submitted. The use of a peer reviewer/ reviewers for key deliverables (namely the policy and strategy) will be required.

3.5 Time Schedule

The project will likely be initiated during the 2015/2016 financial year and must be concluded within 24 months from the date of initiation (*i.e.* signing of the contracts). The first editions of the policy and strategy must be completed within the first year of the project. The time remaining must be used to finalise all the other relevant deliverables, with the view of incorporating the lessons learnt during this time into the final edition of the policy and strategy towards the end of the project contract. Allowance for time to close the project must also be made.

4. DESCRIPTION OF PROJECT COMPONENTS

4.1 Component 1: Project Inception

4.1.1 Purpose:

To present a final description of the scope of work, project programme and resource requirements.

4.1.2 Comments:

The purpose of the Project Inception Report is to agree on the methodology to be used, the project team, the project deliverables and the programme. The Project Inception Report should form a report on its own and a complete final draft version should be ready within the first two months from commencement of the project. Stakeholder consultation should form part of the determination of the final scope of work.

The approved Project Inception Report shall form part of the project contract and is to complement the original Terms of Reference.

4.1.3 Deliverables:

- An approved Project Inception Report.

4.2 Component 2: Situation Assessment and Gaps Analyses

4.2.1 Purpose:

To gather and organise information on current and emerging WQ trends, WQM approaches, the challenges faced and possible solutions and to standardise on WQM related terminology to be used during the project.

4.2.2 Comments:

This component should identify current as well as emerging resource water quality, WQM and integration problems and challenges. Water Sanitation issues as relevant to the project scope must also be taken into consideration. The root causes of these challenges should be identified and documented. It is not the intention of this component to do detailed analysis of the current state of the quality of South Africa's surface and ground water. Methodologies that would allow for a current national perspective and that would adequately inform the strategy within the required timeframes of the project must be used.

This component should further consult and assess international and national WQM policy, strategies, practices, approaches, concepts and other related information in order to formulate the policy, strategy and actions (as per component 3, 4 and 5).

Component 2 should highlight appropriate best international practice and summarise the usefulness of such practices in the South African context. Descriptions of the key aspects of the WQM approach followed in at least 5 countries (consisting of a mixture of first world and developing countries) must be included in the survey. Local case studies which display key concepts that could inform the strategy should also be included in the survey.

Component 2 should also compile and maintain a glossary of WQM, and related terminology to be used during project execution, in order to aid in the consistent application of such terms. In this context WQM relates to all aspects of management; including planning, protection, enforcement, regulation, monitoring, etc.

A literature database as well as all information sourced for this component will need to be provided to the client in a properly structured electronic format at the end of the project.

It is foreseen that Component 2 will only conclude when all management instruments have been fully conceptualised. Information from the review and outputs from other components must result in a gaps analysis, followed by the prioritisation of those gaps.

4.2.3 Deliverables:

- A Report on Water Quality and Water Quality Management Challenges in South Africa and their causes;
- A Literature Survey Report of international, national and any other applicable policies, strategies, practices, approaches, concepts and other related information;
- A Literature Database and electronic copies of literature; and
- A Glossary of WQM related terminology should be produced.

4.3 Component 3: Development of a WQM policy

4.3.1 Purpose:

To establish a policy for WQM.

4.3.2 Comments:

Component 3 is to establish a framework policy for WQM. The purpose of the framework policy is to formalise the Department's position in respect of WQM and should include appropriate policy principles and statements. The policy horizon will be 20 years and it thus has a long-term application. Component 3 will evaluate the 1991 and 2006 WQM policy document, as well as other relevant documentation that are available. All shortcomings must be identified and addressed, in particular with respect to the current water and environmental management legislation and executive policy potentially applying to WQM. In addition, Component 3 should also ensure that "horizontal" and "vertical" integration between current and to-be-established policy instruments exist. The policy must be aligned with existing government imperatives, including the requirement for sustainable development and it must fit within the larger policy framework.

A first edition policy must be developed within the first year of the study with the final edition to be produced towards the end of the study. Lessons learnt and any relevant additional information obtained during the course of the project should be used to produce the final edition of the policy.

Provision should be made for a foreword to be provided by DWS management and for the time required for obtaining approvals for the final edition of the policy.

Consultation with key stakeholders is essential under this component. Relevant previous consultations conducted by the Department must also be considered in the development of the Policy.

Further comments relating to this component are provided in Section 2 of this Terms of Reference and must be taken cognisance of.

4.3.3 Deliverables:

- A WQM Policy (first and final edition);
- A summary policy document used for communication purposes; and
- A “friendly” version of the policy.

4.4 Component 4: Development of an IWQM Strategy

4.4.1 Purpose:

To establish an IWQM Strategy.

4.4.2 Comments:

Component 4 entails assessing and agreeing on what will be needed in order to implement the WQM policy from component 3. The strategy must define what needs to be done by the Department and the larger water sector in order to achieve IWQM. As part of the development of the Strategy, the WQM process, and roles and responsibilities with respect to functional mandates must be defined at the appropriate level. Details on by when and by whom specific actions are to be undertaken will be defined in component 5.

In defining the IWQM Strategy, alignment with relevant executive policies and strategies, including the NWRS-2, will be essential. The IWQM strategy would have a 10 year horizon and should be based on existing relevant strategies (including the 2006 RDMWQ Strategy), the outcomes from Component 2, and expectations and recommendations from stakeholders (component 6). In addition, previous documented recommendations such as, but not limited to the following, should form part of the development of the IWQM Strategy:

- DWAf, 2011. Planning level Review of Water Quality in South Africa; and
- National Economic Development and Labour Council (NEDLAC), 2010. Review of Water Quality Reports and Catchment Management Plans: Summary of the Water Quality Risks.

In addition to the above requirements, the strategy must address the ‘integrated’ component of IWQM. It must be pragmatic, allow for the application of the concept of adaptive management and must provide the necessary level of detail on how to address the challenges identified in component 2. The IWQM Strategy will be a national strategy and as such must give clear and adequate direction to other scales of strategy development and implementation.

A wide range of aspects should be considered in the development of the strategy. These aspects may relate to (but are not limited to): the application of regulatory, financial, self-regulation and civil instruments; research and innovation; communication, capacity building and empowerment; mechanisms for integration and co-operation; and various thematic water quality issues, such as nutrient enrichment. Various emerging aspects, such as water quality offsetting, the use of buffer zones, and the management of complex organic compounds, should also be considered

Although a number of criteria for the development of the strategy are provided in the paragraphs above, these may be refined and expanded during the initial phases of the project.

Given that water quality management is complex and may be sub-divided into categories in numerous different ways, careful thought to the layout of the strategy should be given. Provision should also be made for a foreword to be provided by DWS management and for the time required for obtaining approvals for the final edition of the strategy.

A first edition strategy must be developed within the first year of the study with the final edition to be produced towards the end of the project. Lessons learnt and any relevant additional information obtained during the course of the project should be used to produce the final version of the strategy.

Further comments relating to this component are provided in Section 2 of this ToR and must be taken cognisance of.

4.4.3 Deliverables:

- A IWQM Strategy (first and final edition); and
- A summary strategy document used for communication purposes; and
- A “friendly” version of the strategy.

4.5 Component 5: Converting Policy into Practice

4.5.1 Purpose:

To facilitate the identification of actions and responsibilities to give effect to the WQM Policy and IWQM Strategy.

4.5.2 Giving Effect to Policy and Strategy

The strategy must lead to action and must be very clear on the roles, responsibilities and mandates within and among water institutions and the water sector at large. Component 5 must facilitate this requirement and, as such, consists of 1) developing actions that would provide the detail necessary to turn the IWQM Strategy into action 2) clearly defining the roles and responsibilities of the various WQM role players in the Department and larger water sector in undertaking those actions and 3) developing mechanisms and platforms for integration and for reporting on the progress of those actions and the success of the strategy. Section 4.5.3 below, further gives effect to the achievement of the WQM Policy and IWQM Strategy through the development of recommendations for changes to the Department’s WQM organisational design. Other appropriate tools that could pave the road to action may also be developed as part of this component.

In defining how policy will be converted into practice, priority actions should be highlighted and possible risks should be identified. The actions should not only be relevant to the DWS, but to all other relevant sectors and should align to other actions that have been put in place to implement related executive policies and strategies. Roles, responsibilities and timeframes for undertaking the actions required to give effect to the policy and strategy may be updated as the project proceeds.

Given the large number of sectors that play a role in WQM, integration and co-operation will need to be a facilitated process and recommendations for co-ordination platforms for the achievement of the integration component of the IWQM Strategy must be provided. To insure that the strategy leads to action, a monitoring and reporting system will also be required. The format of reporting on progress and outcomes should satisfy the needs of various target audiences. The system should include the use of indicators that not only measure progress but also *meaningfully measure the success* of the strategy.

Stakeholder consultations should be used to provide inputs to this component.

4.5.3 WQM Organisational Design.

The WQM Policy and IWQM Strategy will inform the WQM functions and structures within the Department and supporting institutions (such as CMAs). This component should provide recommendations on the improvements/changes that will need to be made to the Department’s

functions and structures. Component 5 should also provide concept inputs to Work Plans for relevant officials, including middle and senior management officials.

4.5.4 Deliverables:

- A *Policy into Practice* report detailing the actions, the roles and responsibilities, timeframes, and the co-ordination structures/framework (first and final edition);
- Development and testing of an organised method (system) for monitoring and reporting on the conversion of policy into practice and the realisation (and success) of the WQM Policy and IWQM Strategy;
- A report recommending organisational improvements (functions and structures) for IWQM; and
- Concept Work Plans for relevant officials.

4.6 Component 6: Stakeholder Consultation and Communication

4.6.1 Purpose:

To consult key stakeholders and communicate project progress to relevant parties.

4.6.2 Comments:

Stakeholder consultation and information dissemination to interested parties (including the public), forms an important aspect of this project. It is also envisaged that in order to allow for effective participation, *capacity building of role-players and stakeholders will be required* in terms of aspects such as Water Quality Planning and Management concepts and principles.

Stakeholder consultation is required at various levels and within most of the study components. In the inception phase (component 1) consultation will be required to obtain inputs to the study approach and goals, in component 2, consultation may be required with various specific individuals and sectors in order to obtain information. Focus group discussions, in addition to broad stakeholder meetings, may be required during component 3, 4, and 5.

The introduction of users to the project and/or its deliverables (and accompanying “user friendly” material) should be done by means of a series of road shows to the departmental provincial offices. Key extra-departmental stakeholders should also be involved during these road shows. Practical case study applications of the project deliverables can be considered as a means of introducing and testing the project deliverables during the road shows. Provision should also be made for the preparation of materials to be provided at various selected catchment forums as well as at high level meetings with the various collaborating government departments.

A public “*communication event*”, such as a National WQM conference will also be required, and should preferably take place after the first editions of the policy and strategy have been developed. The conference should be aimed towards the water and sanitation sector and should be structured in a way that will enable the project team to 1) provide feedback on the project, 2) obtain ideas, 3) learn from case studies, 4) create and foster networks and 5) discuss WQM related topics.

It is important that stakeholders be engaged in a manner that enables appropriate participation, co-operation and sharing of information. Communication of the project’s intentions, process, progress and outcomes to the general public must also be conducted in an appropriate manner. A variety of communication material for sharing information with the stakeholders and the general public will be required and should include: the generation of information and graphics that can be accessed through the Departmental website, newsletters, media briefings, and other “user friendly” documentation (such as posters, brochures, etc.).

A concise stakeholder consultation and communication strategy, detailing the consultation activities to take place as well as the communication activities (means of communication, communication schedules, the intended target audiences, methods of communication, message contents, etc.) needs to be developed and implemented. It is foreseen that this strategy will be updated throughout the project. The final report (Consultation and Communication Report), will be required at the end of the study contract and must include information on the outcomes and success of the communication process. A separate capacity building report may be necessary, which details the capacity that has been built through the activities of the project.

The PSP must ensure that that study stakeholders have access to any large documents that may not be placed on the public website (such as draft deliverables that require commenting). It is foreseen that only the final draft / signed reports will be placed on the DWS IWQM Strategy Website for access by the public.

All communication initiatives should adhere to the DWS communication protocols.

4.6.3 Deliverables:

- A stakeholder consultation and communication strategy;
- A project Information Management System, designed to share large deliverables for comment by stakeholders;
- A comments and responses register to deal with input received on all project deliverables needs to be maintained during the project life;
- Detailed stakeholder database as well as consultation database (date of consultation, purpose, number of attendees, etc);
- Capacity building of key role-players and stakeholders;;
- All web page content, including graphical content, necessary to introduce, illustrate and/or explain project information, progress and deliverables. The said web page content will need to be periodically updated and will be utilized by the departmental administrator to populate a web page on the Departmental Web Site throughout the project contract period;
- Up to four newsletters (maximum 15 pages), and Background Information Documents (BIDs) (maximum 10 pages) for each of the Project Management and Project Steering Committee meetings; all in colour with graphical content, where appropriate, needed at key milestones to communicate study information and progress to study stakeholders;
- Other “User friendly” material, such as brochures, posters and/or pull-up banners;
- A public “*communication event*”, with accompanying event documentation (invitations, programme, presentation catalogue and summary of key outcomes).
- Up to ten Road-shows;
- PowerPoint presentations; and
- Graphic’s input on project deliverables.

4.7 Component 7: Project Management and Administration

4.7.1 Purpose:

To ensure that project execution complies with the project contract and that project management is efficient and effective.

4.7.2 Comments:

It is expected of the successful PSP to assist the Project Manager with contract management and to provide for secretarial services, administrative support and liaison with stakeholders

where necessary. Further details regarding the project management and administration reporting requirements are provided in section 6 of this ToR.

Inputs on progress reports to top management will be required from time to time, as well as assistance with presentation material for discussion at DWS management meetings. The project programme should therefore make provision for providing additional reporting assistance on project progress and deliverables.

4.7.3 Deliverables:

- Project meetings at the required intervals, presentation material, progress reports and meeting administration in order to realise a well managed project; and
- Inputs to presentations and reports to DWS management.

4.8 Component 8: Project Closure

4.8.1 Purpose:

To ensure that successful project closure is obtained

4.8.2 Comments:

It is expected of the successful PSP to ensure that the study is successfully and properly closed. During this time all final study deliverables must be properly packaged and submitted, including meeting records, databases, presentation materials, *etc.*

Letters for the dissemination of a pack of the *final editions of the main project deliverables* to the heads of all key water quality line-function managers in the Department and relevant water management institutions will be required at the end of the study. In addition, at least 10 packs of copies, provided in suitable packaging, of *all final project deliverables* will also be required for dissemination to the project team which will include the members of the Project Administration Committee (PAC). Further details regarding the reporting requirements for this project are provided in Section 5 below.

Inputs to a project closure report as per the requirements of the DWS Supply Chain Management, detailing overall project performance, whether all deliverables have been met, project challenges, *etc* will also be required. A technical close out report and a summary presentation of the project will also be required. The technical close out report should prioritise at least five WQM gaps which require further attention and provide descriptions of approaches to address these gaps.

4.8.3 Deliverables:

- Supply Chain Management project close-out report, detailing overall project performance;
- Technical close-out report; and
- Final presentation summarising the project outcomes, including explaining key WQM concepts.

5. REPORTING REQUIREMENTS

The following reporting requirements are relevant to the reports and information generated by this project:

- Reports shall be written in a clear and concise manner and information presented in a user friendly format.

- All first draft reports shall be proof read by a person approved by the PAC before being submitted to the Project Management Committee (PMC) and Project Steering Committee (PSC) for review. First draft reports will include all introductory pages, completed summaries and all Annexures and give comprehensive technical descriptions of the processes followed and the results achieved. First draft reports should require limited Client input and if it is submitted incomplete, it will not be considered as the first draft and will be returned to the PSP. The PSP must allow four weeks in the project programme for the review of documents;
- All documents shall comply with the *Standard for Documentation produced within the Water Resource Planning System Series*;
- All reports shall be produced free of any copyright restrictions by the authors and reports should be available for reproduction if needs be;
- 10 hard copies of *draft* reports are to be submitted (for commenting by the Project Administration Committee), as well as in electronic (MS Word) format (for record keeping purpose and commenting by the Project Management and Project Steering Committee);
- Copies of the main bound *final* reports are to be submitted to DWS as follows (the number of hard copies for any deliverables not specified below will be finalised in the inception report);

Deliverables	Number of sets
Inception Report (Final)	10
SA Water Quality and WQM Report (Final)	10
Literature Survey (Final)	10
WQM Policy (First Edition)	100
WQM Policy (Final Edition)	400
Summary and User friendly versions of the policy (Final)	400
IWQM Strategy (First Edition)	100
IWQM Strategy (Final Edition)	200
Summary and User friendly versions of the strategy (Final)	200
Policy into Practice Report (First Edition)	100
Policy into Practice Report (Final Edition)	100
WQM Organisational Report (Final)	20
Communication Strategy (Final)	10
Technical Close-out Report (Final)	10

- lastly, one unbound copy of each final deliverable, one electronic copy in MS Word format on CD and 200 electronic copies in PDF format on CD are also to be supplied.

6. PROJECT MANAGEMENT

A large number of key role-players will need to be closely involved in the development process for the WQM Policy, Strategy and Actions. It is foreseen that the below project committees will be required in order to allow for 1) effective and rapid day to day management and administration by the client 2) inclusive management which allows for decisions to be influenced and made by DWS WQM line-function personnel and 3) inclusive management that allows for the project to receive strategic direction from key external stakeholders. The PSP will be required to develop a concise description of the roles, and functions of the project committees in the project governance, to be agreed upon with the members of those committees. The PSP may refine this structure should they feel that an alternative may function more effectively.

6.1 Project Administration Committee

A Project Administration Committee (PAC), made up of the PSP, the project manager, deputy manager, co-ordinator and other key DWS experts in WQM and Policy and Strategy development will be responsible for undertaking the day to day management of the study. It is foreseen that this committee will meet on a monthly basis. A financial and progress report will be required for each PAC meeting. The PSP will be required to provide records of recommendations/decisions taken at these meetings.

6.2 Project Management Committee

A Project Management Committee, made up of DWS WQM line-function directorates and sub-directorates from both the National and Provincial Office will be responsible for ensuring that the concerns and requirements of each WQM line functions are adequately catered for, within the scope of the study, and that deliverables are suitable to be presented to extra-departmental role-players. It is foreseen that this committee will meet at key milestones in the project. A financial and project progress report will be required for each PMC meeting. The secretariat for the PMC will also be provided by the PSP.

6.3 Project Steering Committee

The PSC will be responsible for the strategic direction and technical input to the project. The PSC will also be involved in final sanctioning of all project deliverables. The PSC will consist of representatives of the CD: Water Ecosystems and CD: Integrated Water Resource Planning as well as any additional DWS representatives that should form part of the PSC, including but not limited to all WQM line-function directorates and sub-directorates.

The PSC will also include other governmental departments as well as key extra-departmental role-players (such as SALGA and National NGOs).

It is envisaged that the PSC will meet at every key milestone during the project duration (minimum of two meetings in the first year and one meeting in the year thereafter). The secretariat for the PSC as well as the venue will be provided by the PSP. Presentations, background information documents, copies of newsletters, and copies of summary documents will be required prior to PSC meetings.

7. ORGANISATIONAL MATTERS

7.1 Client and project name

DWS will act as the Client for this project through the Chief Directorate Water Ecosystems Management (WEM) and the Sub-Directorate Water Quality Planning (WQP).

The formal project name shall be: ***“DEVELOPMENT OF AN INTEGRATED WATER QUALITY MANAGEMENT STRATEGY”***.

7.2 Execution, supervision and control

Supervision of the project and the management of administrative and contractual matters will be conducted by the Sub-Directorate Water Quality Planning of the Directorate Water Resource Planning Systems, Chief Directorate Integrated Water Resource Planning.

The project will be administered by the PAC and PMC, under the technical guidance of the PSC.

7.3 Programme of work

The programme of work for the project will be formalised through the Project Inception Report. The time allowed for the project is as stipulated under Section 3.5.

8. INFORMATION TO BE PROVIDED IN THE PROJECT PROPOSAL

8.1 Request for Project Proposals

This Request for Project Proposals contains a concise background description and project layout, and intends to provide sufficient information to enable the prospective PSP to compile a coherent Project Proposal based on the provided Scope of Work.

8.2 Extent of the Project Proposal

The Project Proposal shall include both technical and financial proposals.

All the discussions in the technical proposal should be to the point and the text should not exceed twenty five A4 pages, excluding appendices, at a font size of not less than 11 and a line spacing of not less than 1.

Any additions to the scope of work which the PSP wishes to submit must be separately costed.

8.3 Methodology

The Project Proposal must contain a clear and to-the-point description of the project methodology, demonstrating the PSPs understanding of the Scope of Work. It is advisable to break the Scope of Work up into phases and/ or tasks, and to demonstrate how these relate to one another, and how they contribute towards the project goals. A duration schedule and schedule of responsibilities need to be included in the project methodology. In addition, the deliverables that can be expected from the proposed project should also be described and associated with the methodology descriptions.

8.4 Experience

It will be necessary to have a capable PSP project manager and/ or project co-ordinator who have extensive proven experience in *resource water quality management and strategy formulation*. PSP task leaders shall have proven expertise in the applicable fields they are to be leading.

Proposals should include project team members with experience in - :

- Integrated water resource management;
- The development of water resources policy, strategy and management instruments;
- Providing policy and strategy implementation support;
- Water quality and waste management;
- Water quality planning, modelling and predictive methods;
- Groundwater management;
- Wetland, estuary and riverine ecology;
- The determination and implementation of resource directed water quality measures for surface and ground water resources;
- Working with the biodiversity, agricultural, mining, urban/domestic and industrial sectors;
- Water quality data management (statistics, data handling, interpretation and reporting);

- Water and environmental law;
- Water and environmental economics;
- Water pricing and financing studies;
- Institutional analysis and development;
- Communication (including workshop facilitation and the design of communication material), stakeholder participation and capacity building;
- Project management and administration; and
- *Any other experience that might prove to be valuable to the aims of the project.*

Summaries of experience should indicate the years of relevant experience, the names of relevant projects, the names of the clients, the size of the projects and dates the projects were completed.

8.5 PSP Capacity and Capability

The capacity and capability of the project team to undertake the project must be clearly described. The project team must be well balanced and must have the required expertise and resources required to undertake the project. The Project Proposals must contain explicit information about the role of each of the team members in respect of the proposed project. Information on the project team members should include details of appropriate tertiary qualifications (relevant to the list of fields in section 8.4), years of experience and focus of expertise.

PSPs that do not have in-house capacity, capability or specific technical expertise in any particular aspect of the assignment are free to form associations or joint ventures with other PSPs that would provide the necessary services. The Project Proposal documentation must provide details about the nature of such collaborations.

Project Proposals should also contain information on the provision, roles and capability of support/ administrative staff.

8.6 Capacity Building and Participation of HDIs and HDEs

The participation of HDIs (Historically Disadvantaged Individuals) in the project is recommended. The definition of an HDI follows that of the Department's current policy.

PSPs are also encouraged to form associations or joint ventures with HDEs (Historically Disadvantaged Enterprises). 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 project;
- The roles of HDIs in the Project, including HDIs that are participating for capacity building purposes; and
- The composition of HDEs that participate in associations or joint ventures formed for this project.

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

8.7 Curricula Vitae (CVs)

Abridged CVs of all key personnel on the project team should be attached to the proposal. The extent of each abridged CV should be no longer than 2 (two) A4 page at font-size of not less than 11 and at line spacing of not less than 1.

8.8 TAX clearance certificate

No contract may be awarded to a PSP who has failed to submit an original Tax Clearance Certificate from the South African Revenue Service (SARS) certifying the taxes of that PSP to be in order or that suitable arrangements have been made with SARS.

8.9 Budget, Finances and Approach

The total price (including VAT) that the applicant will charge to deliver services in accordance with the ToR must be clearly indicated. Payment for services will be made per deliverable and the applicant must, together with the project proposal, provide clear indications of how the costs of the project (per deliverable) were derived (examples are provided in **Annexure A1 and A2**). Additional tasks/deliverables that might add value to the project scope must be costed separately.

A schedule of proposed charge-out rates of all the individual PSP team members must also be provided to allow the Evaluation Committee to properly evaluate this part of the bid (an example is provided in **Annexure A3**). It will further be required of each bidding PSP to prepare a detailed project program (Gantt chart).

It should be noted that all additional team members that are added to the project team after the project contract is in place will be required to comply to DWS rates, unless special circumstances apply. In addition, as payment will be per deliverable, provision for annual rate increases must be incorporated into the budgeted project amount.

9. EVALUATION SYSTEM

DWS will evaluate all proposals in terms of the Preferential Procurement Policy Framework Act. No. 5 of 2000 (PPPFA). A three phase evaluation criteria will be considered in evaluating the bid being:

Phase 1: Administrative Compliance.

The following must accompany Project Proposals:

- Compulsory Briefing Session Certificate;
- Signed SBD document; and
- Valid Tax Clearance Certificate

Phase 2: Functional/Technical Evaluation.

Functionality Evaluation Criteria		
	Criteria	Weighting Points Awarded
Functionality	Methodology	30
	Past Experience	25
	Team Capability	35
	HDI Participation	10
Total		100

The bidder is expected to achieve a minimum threshold/ required score for functionality of 70% in order to qualify for further evaluation. Further evaluation is based on *Price* and *Preference* (refer to phase 3).

Phase 3: BBBEE Status Level Contributor.

Points will be awarded to a bidder for attaining the B-BBEE status level of contributor in accordance with the table below:

Price: 90 points

BBEEE Level Contributor: 10 points

B-BBEE Status Level of Contributor	Number of Points (90/10 system)
1	10
2	9
3	8
4	5
5	4
6	3
7	2
8	1
Non-Compliant contributor	0

Scores obtained for Price and B-BBEE Status Level are combined to obtain an overall score for each bid. The Functionality score is not factored in the final score, it is only used for screening bids that qualify from those that do not qualify to enter the last stage of evaluation.

Conditions:

- Only bidders who obtain at least 70% under Functional/ Technical Evaluation will be considered for further evaluation.
- Bidders are requested to provide a clear agreement regarding joint venture/consortia. The percentage involvement of each company in the joint venture agreement should be indicated.

10. DEADLINE AND ADDRESS FOR SUBMISSIONS

Proposals are to be submitted in accordance with form *SBD1 "Invitation to Bid"*.

11. ENQUIRIES

For technical enquiries contact:

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(012) 336 7514
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For SCM enquiries contact:

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APPENDIX A1: EXAMPLE OF A TIME AND COST SCHEDULE PER DELIVERABLE/TASK

Task no.	Team member	Company name	Position in company	HDI	Project position/activity	Time schedule	Hourly rate (Excl. VAT)	Total cost (Excl. VAT)
				Yes/no		Man hours	Rand/hour	Rand
COMPONENT 1: TASK 1								
1.	DELIVERABLE: INCEPTION REPORT							
1.1	Z.M. Strichnine	ABC Consult	Director	Y	Project Manager	6	R xxx.xx	R xxx.xx
1.2	J.M. Buxley	ABC Consult	Director	N	Task Leader	7	R xxx.xx	R xxx.xx
Subtotal for professional fees						26		R XX XXX, XX
Disbursements:								
- Subsistence								R xxx.xx
- Printing								R xxx.xx
- Miscellaneous								R xxx.xx
Subtotal for disbursements								R xxx.xx
TOTAL COST: INCEPTION REPORT								R XX XXX, XX
COMPONENT 2: TASK 1								
2A.	DELIVERABLE: XXXXXXXXXXXX							
2A.1	J.M. Buxley	ABC Consult	Director	Y	Task Leader	125	R xxx.xx	R xxx.xx
2A.2	F.M. Morris	ABC Consult	Associate	N	Geohydrology	96	R xxx.xx	R xxx.xx
2A.3	VenTe Chow	ABC Consult	Specialist Associate	N	Hydrology	72	R xxx.xx	R xxx.xx
2A.4	T.Y. Vernon du Mont	ABC Consult	Engineer	N	Flood hydrology	80	R xxx.xx	R xxx.xx
2A.7	M. Mercalli	ABC Consult	Associate	N	Catchment assessment	40	R xxx.xx	R xxx.xx
Subtotal for Professional Fees						1 056		R XX XXX, XX
Disbursements:								
- Travel								R xxx.xx
- Accommodation								R xxx.xx
Subtotal for disbursements								R xxx.xx
TOTAL COST: XXXXXXXXXXXX								R XXX XXX, XX
SUBTOTAL THIS PAGE (carry forward to next page)						1 082		366 480.00

(Multiple Tasks May make up a deliverable. Tasks may also be aligned or inter-related)

APPENDIX A2: EXAMPLE SUMMARY SHEET FOR FINANCIAL PROPOSALS

Task no.	Deliverable description	Total cost of deliverable as per cost and time schedule	14% VAT	Total Task cost
		(Excl. VAT)		(Incl. VAT)
		Rand	Rand	Rand
1	Component 1: Inception Report	R XX XXX,XX	R XX XXX,XX	R XX XXX,XX
2A	Component 2: Deliverable 1	R XXX XXX,XX	R XXX XXX,XX	R XXX XXX,XX
2B	Component 2: Deliverable 2	R XXX XXX	R XXX XXX	R XXX XXX
2C	Component 2: Deliverable 3	R XXX XXX	R XXX XXX	R XXX XXX
	Component 2 Total	R XXX XXX	R XXX XXX	R XXX XXX
3A	Component 3: Deliverable 1	R XXX XXX	R XXX XXX	R XXX XXX
3B	Component 3: Deliverable 2	R XXX XXX	R XXX XXX	R XXX XXX
3C	Component 3: Deliverable 3	R XXX XXX	R XXX XXX	R XXX XXX
	Component 3 Total	R XXX XXX	R XXX XXX	R XXX XXX
4A	Component 4: Deliverable 1	R XXX XXX	R XXX XXX	R XXX XXX
4B	Component 4: Deliverable 2	R XXX XXX	R XXX XXX	R XXX XXX
4C	Component 4: Deliverable 3	R XXX XXX	R XXX XXX	R XXX XXX
4D	Component 4: Deliverable 4	R XXX XXX	R XXX XXX	R XXX XXX
4E	Component 4: Deliverable 5	R XXX XXX	R XXX XXX	R XXX XXX
	Component 4 Total	R XXX XXX	R XXX XXX	R XXX XXX
TOTAL COST OF PROJECT		R X, XXX, XXX, XX	R XX XXX, XX	R X, XXX, XXX, XX

APPENDIX A3: EXAMPLE OF THE SUMMARY OF MANPOWER, TIME AND COST SCHEDULE

Team member	Company name	Company position	Project position (Task)	Applicable experience in task	HDI / woman	Hourly rate	Time on project	% of time on project	Total cost
				Years	Yes/No	Rand/h	Hours		Rand
D.M. Tjaka	ABC Consult	Director	Project manager	25	Y / N	520	20	10	R XX XXX
F.M. Morris	ABC Consult	Associate	Task leader, Hydrology	15	N / N	480	50	25	R XX XXX
VenTe Chow	AquiTech Cons	Geohydrologist	Geohydrology	13	N / N	400	30	15	R XX XXX
T.Y. Matatile	ABC Consult	Director	Task leader, Geohydrology	6	Y / Y	500	40	20	R XX XXX
A. Einstein	ABC Consult	Associate	Hydrology	10	N / Y	120	15	7.5	R XX XXX
Z. Zuma	ABC Consult	Technician	Support	2	Y / Y	110	35	17.5	R XX XXX
M. Mercalli	B&T drilling	Specialist techn.	Geohydrology	20	N / N	350	10	5	R XX XXX
TOTAL							200	100	R XXX XXX