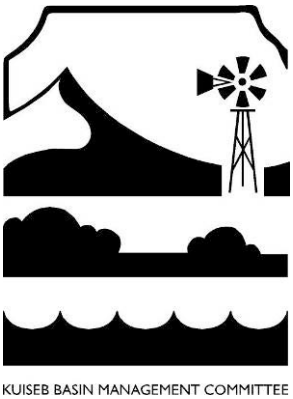
REPUBLIC OF NAMIBIA

MINISTRY OF AGRICULTURE, WATER AND FORESTRY

DEPARTMENT OF WATER AFFAIRS AND FORESTRY

KUISEB BASIN MANAGEMENT COMMITTEE



Kuiseb Basin Water Resources Management Project

Development of a Water Resources Plan for the Kuiseb Basin

and a

Generic Water Resources Planning Procedure

LEGISLATION FOR WATER ABSTRACTION

COMPILED BY:

P HEYNS Pr Eng
Heyns International Water Consultancy (HIWAC)
P O Box 22184
WINDHOEK

October 2008

TABLE OF CONTENTS

1. Introduction

Water resources in Namibia are very scarce due to the low rainfall and high evaporation. This complicates the availability and supply of water for domestic, industrial and agricultural uses. Water managers in arid areas must therefore have a very clear understanding of the constraints and opportunities when the utilization of water resources is planned. This will facilitate the development of an appropriate legal and institutional framework to address and direct the challenge of water management. This means that appropriate proper policy, laws and regulations should be in place to guide the water managers and water users.

The purpose of this document is to provide a brief overview of the of the existing policy, legislation and regulations regarding the abstraction of surface water from perennial and ephemeral rivers, including the construction of small dams, groundwater abstraction in water control areas and pollution control. Reference will also be made to the new legislation that will probably come into force in the near future

A description will be given of how a water area management institution and the Department of Water Affairs and Forestry (DWAF) in the Ministry of Agriculture, Water and Forestry (MAWF) can cooperate when the evaluation of applications for the allocation of permits for the different water uses mentioned above are considered.

The application of these procedures in the Kuiseb Basin and how the Kuiseb Basin Management Committee (KBMC) could be involved constructively in the process of awarding permits or licenses will also be advised upon.

The present methodology to evaluate applications for permits to abstract surface and groundwater sources, or to construct farm dams or to dispose of waste water will be elaborated.

2. Background

The occurrence of the different sources of water such as rainfall, surface water runoff in rivers, as well as the water stored in aquifers, dams, lakes and wetlands are not only related to the hydrological cycle, but linked to each other. The quality and quantity of these resources are affected by the biophysical environment and human activities.

Other factors that complicate water management are population growth and urbanization which concentrates water users, as well as socio-economic growth which increase the potential for an improvement in the standard of living of the people and a subsequent increase the demand on already scarce water resources. The creation of job opportunities, poverty alleviation and food production are directly proportional to the demand of water for industrial, mining and irrigation development.

The development, use and management of water resources are also dictated by technical, environmental and socio-economic issues which must be considered as an integrated whole to support the sustainable, equitable and efficient use of water. The water demand, the availability of water to meet the demand, the quality of the water, the allocation of water to different uses, the way the water is used and conserved or wasted and how the waste water is disposed of must all be accounted for when water resources are managed in a holistic way.

This situation calls for clever resource management to ensure the equitable allocation of the available water resources to the different users, to reduce excessive demands, to stretch the quantity of water available to meet the reasonable demand of all potential consumer groups and to dispose of effluent in an environmentally sustainable way. An integrated approach is therefore required when water

managers are planning the development of water resources for human benefit in such a way that environmental integrity is maintained. This is the basis of the need for appropriate water legislation.

3. Water Legislation

3.1 Introduction

The administration of water affairs in Namibia is based on a number of pillars. These are the Constitution of the country, water policy, water law and water regulations promulgated in terms of the water legislation.

Article 95 of the Constitution of the Republic of Namibia deals with the maintenance of the welfare of the people. The adoption of water, sanitation and environmental policies, is facilitated by the provisions of Article 95 (l) which states that the Government must adopt policies for the maintenance of ecosystems, essential ecological processes and the biological diversity of the country, as well as the utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future.

In terms of Article 63 of the Constitution, the National Assembly has the power, subject to the Constitution, to make and repeal laws for the peace, order and government of the country in the best interest of the people.

Similarly, Article 100 of the Constitution deals with the sovereign ownership of natural resources. According to this Article, the land, water and natural resources of the country shall belong to the State, if they are not otherwise lawfully owned. The Constitution therefore enables the Government to promulgate water legislation to exert control over the allocation, use and disposal of scarce water resources in the face of competing demands on the resources and the environment.

3.2 Existing Water Policies

The existing water policies in place are the Water Supply and Sanitation Policy (WASP) adopted in 1993 (DWA 1993), the National Water Policy (NWP) adopted in 2000 (MAWRD 2000) and the Water Supply and Sanitation Sector Policy (WASSP) which will most probably be adopted in 2008 (DWAF2008).

What should also be kept in mind is that water policy has a formal and an informal side. It is possible that within the framework of formal, generic policy statements, such as the NWP, and the subsequent legislation to formalize the practical implementation of certain policies, there are many internal water management policies which are not enforced by law, but is practiced in the general administration of water matters. Some of these policies are contained in the regulations promulgated in terms of the law, others may be based on Cabinet decisions and some may part of the daily decisions by the management of the MAWF or the DWAF.

A few of the formal and informal policy issues that relate to the management of water abstraction, water allocation, water supple infrastructure development and pollution control will be highlighted here.

Water policy in Namibia is tailored to the availability of water in an arid, developing country and the specific needs of the population. The WASP policy states that essential water supply and sanitation services must become available to the whole population, and should be accessible at a cost that is affordable to the country as a whole. The equitable improvement of services should be achieved by the combined efforts of the Government and the beneficiaries, based on community involvement, community participation and the acceptance of a mutual responsibility. Communities should have the right, with due regard for the needs of the environment and the resources available, to determine

which solutions and service levels are acceptable to them. Beneficiaries should contribute towards the cost of services at increasing rates for standards of living exceeding the levels required for providing basic needs. The environmentally sustainable development and utilization of the water resources of the country should be pursued in addressing the various needs.

The overall water management functions and broad division of responsibilities within the water supply and sanitation sector are of extreme importance to achieve successful water management. The most important functions that are primarily the responsibility of the Government is the development of water policy and water legislation, the promulgation of water regulations, the strategic planning of water development and exercising control over the development, utilization, conservation and protection of the natural water resources of the country. This control is vested in the administration of the water legislation (DWA 1991).

Water supply services can be divided into three groups. These are firstly the formal, large scale or bulk water supply services, secondly the informal, small scale rural community water supply services and lastly the services related to the reticulation of water to consumers under the control of local authorities, as well as the disposal of waste water.

The allocated responsibilities in terms of the WASP policy have been implemented to a large extent because the formal bulk water supply services are provided on a commercial, full supply cost recovery basis by the Namibia Water Corporation (NamWater), rural water supply services are rendered by the Directorate of Rural Water Supply (DRWS) in die DWAF and local authorities are responsible for water reticulation and waste water disposal. The DWAF remains responsible for water resource management, including the control over waste water disposal

The overall financial sustainability of the water and sanitation sector in Namibia is also addressed in the water policy. Financial sustainability will depend on the ability of the water sector to become self-sufficient by recovering capital investments and interest, as well as operating costs. However, when this is not immediately possible, at least the running and maintenance costs should be recovered from the consumer. The ability to pay and poverty issues should also be considered, but the detail of an appropriate tariff policy to achieve this objective should be worked out in consultation between the stakeholders and each of the institutions responsible for water supply, reticulation and sanitation. Some guidelines and basic principles are provided in the policy, but the detail will not be elaborated here.

Namibia has limited water resources and policy is required to prioritize the uses of water when it comes to the allocation of water for competing demands. In this regard, there are two priorities approved for the allocation of water to competing demands. The first priority is water for life and that includes the provision of water for basic domestic use and livestock. The second priority is the allocation of water is for economic activities such as mining, industry, manufacturing and irrigation, but, the eventual allocation of water to any one of the economic uses will in each individual case be determined by its respective value in relation to the overall development objectives and plans for the country. The management of water demand, water conservation and environmental issues are also addressed in the policy

The treatment of domestic and industrial waste water is a very important issue in any arid country, because pollution must be prevented and as much of the effluent as possible should be re used. Domestic waste water that discharged from individual premises into a sewage system under the control of a local authority must be collected for disposal and/or treatment at central sites dedicated to such disposal. The effluent can be disposed of by means of evaporation in evaporation ponds, or the treated water can be reused for the watering of gardens, parks and golf courses or released into a public stream if the quality of the treated water is of an acceptable standard. The water may also be reclaimed to potable water quality standards as is the case in the City of Windhoek. Formal water-borne sewage disposal services are generally only rendered in urban areas and larger villages or at

mining development sites and tourism centers in game parks, but other appropriate sewage disposal methods (dry or vacuum systems) are implemented where there is a scarcity of water. The responsibility to ensure that these services are provided is not only the responsibility of local authorities, but the private sector and government institution are (Ministry of Works) also be involved to assist.

Mining and industrial waste water is often of a very toxic nature and must be treated appropriately, especially within urban areas and at mining sites. In cases where the quality of industrial effluent in urban environments is too toxic for treatment in normal sewage treatment works, either the local authority or industrial concern must cater for its own wastewater treatment and disposal. In the case of mining activities the waste water should be recycled as far as possible and all tailings should be stored in properly constructed dams where the leakage of toxic water is prevented. The disposal of waste water by local authorities and the private sector is therefore controlled in terms of waste water disposal permits issued by the DWAF. These permits prescribe how the effluent must be treated and disposed of. It is the responsibility of the DWAF to monitor compliance with the permit conditions and to impose penalties when it is not done.

During 2007 a rapid assessment, funded by the African Development Bank, was made of the water supply and sanitation sector in Namibia and it was found that the coverage of safe sanitation services was only about 50% in comparison to the coverage of safe water supply services which stood at about 90% for the country as a whole. This called for a revision of the 1993 WASP and in the new WASSP was formulated and will probably be adopted in 2008. One of the most important recommendations is the proposed establishment of a Directorate of Water Supply and Sanitation Coordination the DWAF with a specific mandate and responsibility to improve the sanitation sector to the same levels of coverage as in the water sector.

3.3 Existing Water Legislation

The existing water legislation in Namibia is the Water Act, Act 54 of 1956, herinafter referred to as the Act. The Act was promulgated by the South African Government for South Africa (DWA 1956), but because the then South West Africa was under South African administration, certain Articles in the Act were made applicable in the country to administrate local water affairs. This Act remains in force in Namibia terms of Article 140 of the Constitution until such time as it is repealed or amended by an Act of the Namibian Parliament.

The Act is administrated on behalf of Government by the Division of Law Administration (DLA) in the Directorate of Resource Management (DRM) in the DWAF in the MAWF. The Act gives the Minister responsible for water affairs, the power to take all the steps considered necessary for the investigation, development, control and utilization of water resources, as well as giving effect to the provisions of the Act.

The ownership of water is an important issue when it comes to the authority to control the use of water and to take the responsibility to protect and conserve water resources. The Act makes a distinction between public and private water. Public water is water normally found in a public stream, whether the water is visible or not, for example water flowing underground in an ephemeral watercourse. There is no right of property in public water or private water and the use of the water is regulated by the Act. Private water is water that occurs naturally on the land and may be used exclusively for any purpose by the owner of the land on which the water occurs. The distinction between public and private water in the Act is therefore not meant to determine who owns the water, but to define who has the right to use the water and how it can be used. This is also consistent with Article 100 of the Constitution.

Surplus water is defined in the Act as all public water which is not normal perennial flow. Flood water flowing in a perennial river during the rainy season is water that is more than the normal flow. However, there are no perennial streams with normal surface flow in the interior of Namibia and runoff

is seen as floods or surplus water, which may occur from time to time in the dry rivers. This surplus water is available for further beneficial use, but cannot be utilized unless it is impounded and mobilized for public use. The construction of dams in ephemeral public streams are therefore unavoidable in an arid environment, but the development of dams and the permitted storage capacity of the dams must be authorized according to the conditions prescribed in the regulations promulgated in terms of the Act. This will ensure that an adequate balance of the runoff is available to downstream users and that the environmental integrity of aquatic ecosystems is protected as far as reasonably ossible.

The Minister responsible for water affairs, is empowered by the Act to call for the construction of water works that may be deemed necessary or desirable for the purpose of supplying or conserving water. The Minister may also take measures to drain land, to store water, to prevent the wastage of water or the pollution of water sources by waste water and to control the abstraction of water from any surface or underground water source.

The Act allows for the use of water by people who are not owners of land or riparian to a water source. The Minister can supply water or arrange that water is supplied to any person for any use on any land and the same applies to private individuals, local authorities or any other legal person granted the right to supply public water to any consumer. This is why specific institutions such as NamWater and the DRWS in the DWAF in the MAWF had been established and why some local authorities, such as Otavi, Grootfontein and Windhoek) supply their own water.

The Act makes provision to control the purification or treatment and disposal of any kind of effluent or waste water, as well as preventing the pollution of fresh water sources or marine waters from sources of effluent located on land. In arid areas the disposal of any effluent into ephemeral watercourses is prohibited, unless regulated by a permit with conditions that prescribe the purification of the waste water to such an extent that the effluent is of an acceptable quality. This practice is normally not allowed in Namibia because ephemeral watercourses have very low and erratic runoff which will make it extremely difficult to rehabilitate or flush any pollution from the polluted alluvium in the river beds.

The Minister may also make regulations to prescribe technical requirements in connection with the development and management of water resources. These may make provision to pay subsidies on water works constructed, the levy tariffs and charges for water supplied, and the periodical revision of those tariffs. The Minister may also authorize any person to enter upon private land for the purpose of investigating the feasibility of any water work, or to monitor and inspect water supply schemes, mines, industrial installations and waste water disposal works to ensure that they comply with the provisions in the Act and the permits allocated.

Under the present Act water abstracted for domestic use and stock drinking, as well as for the irrigation of less than one hectare of land is exempted from a permit requirement because the quantity of water involved is relatively small. However, any person or institution that wants to abstract a large quantity of water for commercial use from a public stream or a groundwater resource must make an application for a permit to abstract the water. The applicant must give a description of the water works proposed to abstract the water, the particular water use and the economic viability of the project, as well as the quantity of water required. This application is considered in terms of the availability of water for allocation, other competing uses and the potential of the water resources to sustain the abstraction of the quantity of water requested.

3.3.1 New Water Legislation

Water legislation should be reviewed from time to time to accommodate the latest trends in integrated water resources management, including water conservation, water demand management and the protection of aquatic ecosystems. Water regulations should also be updated to provide for the latest technological advances and innovations to manage the water industry in a sustainable way.

The Namibian Parliament promulgated the Water Resources Management Act, Act 24 of 2004, hereinafter referred to as the Water Act. The Water Act was signed by the President on 8 December 2004, but has not yet come into force and is at present subject to a complete revision. (MAWRD 2004)

The main reasons for amending or improving the Water Act is because it is considered to be inadequate to deal effectively with arid region water management and should be rationalized, modernized and simplified to ensure the sustainable management and conservation of scarce and vulnerable natural water resource in an arid country where there are increasing demands for water, as well as limited human and financial resource to manage water resources efficiently.

3.4 Existing Regulations

There are two important Regulations adopted in terms of the Water Act, Act 54 of 1956. Regulation R1277 was adopted on 23 July 1971 (DWA 1971a) in terms of Article 6 of the Water Act to control the use of surface water and subterranean water. Regulation R1278 was adopted on 23 July 1971 (DWA 1971b) in terms of Article 28 of the Water Act to declare certain areas in Namibia as subterranean water control areas in order to control the abstraction and use of groundwater in those areas.

According to the Regulations any person who plans to sink, enlarge, deepen or alter any borehole or well or to open up or clean any spring or to abstract or use subterranean water, shall apply for a permit. (DWA, 1971a)

4. The Role of the Kuiseb Basin Management Committee

The responsibility for sustainable resource management starts with the resource user, but the Government and non-governmental organizations and the public are also very important role players. Ministries responsible for planning, agriculture, natural resources, lands, public works, health, industry and energy must work together in a coordinated way. That means that there must be the political will, competent authorities and well-informed stakeholders to take the necessary action aimed at solutions that are affordable and within the technical and financial means of the concerned groups.

From the above it is clear that the competent management of water resources under arid conditions is not possible unless proper institutional arrangements are in place, but it also require inputs from a large number of organizations in different sectors. The most vital components to achieve the objectives of sound water management include an appropriate institutional framework, the employment of skilled human resources and the provision of adequate funds.

In order to manage the abstraction of water, the allocation of water, the monitoring of the water sources and the prevention of water pollution the Government encourages local water users to create a management institution to assist the Government to manage the water sources in order to maximize the benefits that can be obtained through the best joint utilization of the available water. This led to the establishment of water management institutions such as the Stampriet Aquifer Committee (SAC) the Karst Water Management Body (KWMB), the Kuiseb Basin Management Committee (KBMC) and the Iishana Basin Management Committee (IBMC). The establishment of these institutions are all in line with the provisions in the Act, the National Water Policy (MAWRD, 2000) and the provisions in the Water Act, which will come into force in due course.

Decentralized water resource management by the public can be considered at the basin level because a drainage basin is normally defined as a geographical area determined by the watershed limits of a system of waters, including surface water and underground water, flowing into a common terminus. A drainage basin, and the natural resources contained in the basin, forms a unitary whole and the logical approach is therefore that a water management institution should be established at the basin level and that the allocation of its responsibilities should preferably be confined to the extent of the river basin.

However,this definition has its limitations because the groundwater resources of the Karst Area, which must be managed as a unit, are in the headwaters of three river basins and the management of the water resources in the Kuiseb Basin is not only confined to the basin because water is transferred from the basin for use in the Swakop River basin immediately to the north of the Kuiseb. The Kuiseb Basin Management Committee has an unavoidable responsibility to extend its mandate as part of a water area management institution for the Central Namib coastal area.

The common purpose of a basin management institution is to give effect to the principles of integrated water resource management by assisting the national government with the decentralized management of water resources in a certain area of jurisdiction. This means that the basin management body must be representative of and facilitate the involvement of the communities and other stakeholders in decision making about the water resources entrusted to the particular body.

A basin management institution may have numerous responsibilities, but one of the most important is to advise the regional or national government on water matters from their perspective and to ensure that everyone has access to sufficient water of acceptable quality; that the water resources are protected against pollution; that the water is used efficiently for the maximum benefit of the population and that environmental sustainability is not compromised in the process.

The KBMC should enter into consultations with the DWAF regarding the policy and strategy for the management of the Kuiseb Basin with regards to the award of permits for the abstraction of water, the allocation of water, the construction of farm dams and the control of waste water disposal by local authorities, the industry, mining operations and any other water users in their area of jurisdiction.

The present cooperation between the existing water management institutions and the Government could serve as an example for the KBMC. In the case of the SAC and the KWMB, the overall management of the groundwater stands on three pillars and is based on the integration of aquifer management, resource management and water demand management. Aquifer management relates to the scientific assessment of the potential of the aquifers, the allocation of water and the monitoring of the behaviour of the aquifers under operational conditions. Resource management refers to the appropriate management of the aquifers and the environment through cooperation between the users, the water area management body and the Government. Water demand management refers to the responsibility of all water users to ensure loss control, efficient water use and irrigation efficiency in order to make water available to as many irrigation farmers as possible, thus maximizing the socio-economic advantages that can be obtained.

The DWAF will not allocate a new permit for the allocation and abstraction of groundwater or withdraw any existing permit in the Stampriet Basin or the Karst Area without consulting the particular water management institution. If the DWAF must to take action against permit holders who fail to comply with the permit conditions, the particular institution will be informed to assist the Government in encouraging the water user to comply with the permit conditions in the interest of the other water users. The DWAF will monitor water levels and aquifer behaviour in order to asses the annual availability of the water that can be permitted for abstraction. The DWAF also keeps all the basin management institutions informed about the results of the monitoring activities and makes presentations about water management issues as part of a capacity building initiative to empower the community to better understand the management, behaviour and protection of the water resources The results are encouraging because the community developed a better understanding of the groundwater systems over time, could make useful contributions to improve the administration of their water resources and became empowered to assist the Government with informed advice about the management and allocation of water.

This is what could be expected when closer cooperation between the KBMC and the DWAF is established when it comes to the allocation of permits for water use and disposal.

5. Evaluation of Permit Applications

5.1 Introduction

In this section the technical and legal aspects of water management which the KBMC should be aware of, will be elaborated in more detail to enable the Committee to make a constructive contribution to the allocation of water and the development of water supply infrastructure in the Kuiseb Basin.

From prior experience with the SAC and the KWMB it was clear that the community expects that the allocation of water should be more transparent and that the DWAF should solicit more community involvement to avoid conflict or fraudulent conduct before allocating a permit for the abstraction and use of water. In both cases it became clear that the management of the aquifers was compromised by persons who abstracted more water than the permitted quantity allocated, people who drilled boreholes illegally and those who did not submit their abstraction returns as required in terms of the permit conditions. Many of these issues had a detrimental effect on the management of the aquifers and the availability of water for all the other users. It soon became apparent that it was in the best interest of all stakeholders to get involved in the monitoring of the abstraction activities as well and to report those people that transgressed the permit conditions to the appropriate authorities to enable them to take remedial action. This understanding between the parties enhanced cooperation to the benefit of all

The priorities for the allocation of water were discussed with the local community and it was agreed to divide the priorities for allocation into primary, secondary and tertiary consumption. Primary consumption is water for domestic use in urban and rural areas, as well as for stock drinking on farms and in the rural areas. Secondary consumption is water for mining, manufacturing and industries. Tertiary consumption is water for irrigation. In the case of the Karst Area the transfer of surplus water to other areas in the country would only be allowed to meet primary and secondary water demands. This is consistent with the transfer of water from the Kuiseb to the Swakop Basin, because no water is used for irrigation.

The principles for, and the award of permits to abstract water should be fair, open and transparent. The stakeholders should be empowered to assist with the decision making process to award the permits as well was to have a say in the management of the available water sources. The requirements for the allocation of water from a dam or a groundwater source are that the water must be allocated for the most beneficial and sustainable uses; the quantity of water allocated should serve as an incentive to optimize irrigation methods, as well as the possibilities for re-use and water conservation. The use of the water should also facilitate further industrial, mining, agricultural and socio-economic development.

The maximum validity period of a permit is five years and the purpose of this is to ensure that the water that has been allocated is used. If the water is used for the intended purpose, the permit would normally be renewed, but if no development has taken place to use the water, the permit will be cancelled and the water allocated to other applicants. The reason for this is that some landowners apply for permits to abstract and use water without any real intention to invest capital in the proposed project to use the water, but just to be able to claim access to permitted water on the land and thus to improve the value of the land for speculation purposes. Permits will not be renewed, or can be withdrawn, if a permit holder fails to comply with the permit conditions, for example to install the required water meters on the abstraction equipment; fails to submit the returns of water abstracted to the DWAF; exceeds the permitted abstraction, does not use the water efficiently or does not use the water that had been allocated.

5.2 The Abstraction and Use of Public Water

According to the Act a permit is required to abstract and use water that is abstracted from a public stream or a groundwater source that is located in a water control area declared by a Regulation under the Act. The Water Act, which is not yet in force and presently under revision, makes provision for the licensing of the abstraction of water in water management areas. The application of the existing legislation will be discussed and reference will be made to the provisions of the Water Act, although it must be kept in mind that there may be amendments.

According to the Act, if a landowner has access to a water resource which can yield much more water on a sustainable basis that can reasonably be used on that land, then that water is considered surplus water. This water can be used by the State to supply other areas where there is a scarcity of water. This is why water is transferred from the Kuiseb Basin to the Swakop River basin. This principle also has the implication that a landowner must be compensated if he should be detrimentally affected by such abstraction and transfer of water in the public interest. That is why the Topnaar community is entitled to the water infrastructure provided free of charge to give the people access to the water and why there is still a responsibility to pay the cost for the operation of the water supply service.

6. The Abstraction and Use of Water Under the Act

6.1 Background

In view of the nature of the arid climate in Namibia, all the watercourses or “rivers” in the interior of the country are ephemeral. Runoff only occurs after a significant rainfall event and the only way in which the surface runoff can be abstracted is that it must be impounded for later use by constructing dams. The country also has perennial rivers on the borders in the north and the south and what should be understood is that the abstraction of water from a public stream in Namibia actually relates to the abstraction of water from a perennial river (abstraction from a continuously flowing source of water) or the abstraction of water from a dam in an ephemeral that impounded the seasonal surface runoff.

The abstraction of water from ephemeral public streams when there is no surface water flowing in the rivers actually means the abstraction of water or groundwater from an aquifer in the alluvium of the river bed. In all cases this abstraction requires a permit to abstract and use the water. However, no permits are required for the abstraction of groundwater from aquifers that are not in public streams, unless a regional aquifer has been declared as a subterranean water control area in terms of Regulation R1278. In such cases the Government controls issues regarding the allocation, abstraction, use and monitoring of the aquifers.

6.2 Surface Water

The consideration of the conditions for permits to abstract water from the perennial rivers will not be discussed because there are no perennial rivers in the Kuiseb Basin. Only the permit conditions for the abstraction of water from dams in ephemeral rivers and aquifers will be elaborated.

The construction of dams with a storage capacity of more than 20 000 cubic metres in ephemeral streams requires a permit. A large dam built in an ephemeral watercourse to supply water for bulk water supply purpose to domestic, industrial or irrigation users must be large enough to impound sufficient water to bridge at least two years of no inflow. The need to build such large dams does not apply to small scale farm dams that supply water for stock drinking and recreational uses. Permission to build large dams are subject to a comprehensive environmental assessment with the objective to identify fatal flaws in the design concept and to mitigate some or all of the adverse environmental conditions identified, if possible. This is not cost effective in the case of individual small dams, but may become an important consideration when a large number of dams are built in the same catchment.

A farmer may construct a small structure in badly eroded streambeds on his farm to capture sediment and reduce erosion as part of a soil conservation program. If the storage capacity of such a structure will be larger than 20 000 cubic metres it is not any more regarded as a soil conservation work, but classified as a farm dam and the farmer must obtain a permit from the DWAF to construct such a dam. In the case of soil conservation works, approval still needs to be obtained from the Department of Agriculture to ensure that the capacity of the dam and the design of the structure conform to the technical requirements specified in the Soil Conservation Act, Act 76 of 1969.

Small farm dams are normally developed to provide water for stock watering or the recharge of groundwater sources or irrigation or for recreational or aesthetic purposes. Such dams can make an important contribution to the water household on a farm. A farm dam can also augment underground water supplies on a farm and in cases where a dam is used to recharge groundwater sources, it must be located upstream of a geological structure through which the water that infiltrates from the dam can reach the aquifer designated to be recharged.

In the past some farm dams in Namibia were specifically developed to supply water for small scale irrigation, but the viability of irrigation with water from small farm dams proved to be inefficient, and of little economic value. Only very large dams (such as Hardap and Naute) have been successfully developed for irrigation purposes.

The emphasis on the need for the construction of farm dams on commercial farms in Namibia has shifted from water supply for domestic use and stock drinking towards enhancing the scenery for tourism, game farming and for professional hunting purposes. These dams are mainly there for recreational purposes, which is a lower priority for the allocation of water as far as the utilization of water for domestic use and other economic uses are concerned. The use of the very scarce surface water resources for recreation or irrigation should be rigorously scrutinized and only approved when an economic analysis shows that no other more efficient or beneficial use can be made of the water. In some cases it may be possible that the unit value of water for recreational purposes is much more than other uses, even if evaporation losses are large.

The application to obtain a permit to construct a farm dam is evaluated by the DWAF as far as the water household on the farm is concerned. The water household comprises the quantity of water required for primary purposes (domestic and stock use) and the ability of groundwater sources to supply in that demand. If the groundwater cannot supply in the demand, the construction of a farm dam can be considered to use surface water for some time during and after the rainy season, thus giving the groundwater source an opportunity to be rested and recharged. The impounded dam water can also be designed in such a way to recharge the groundwater sources.

However, a farm dam must be properly designed by a professional engineer and the DWAF can outsource the analysis of a proposed design to a professional engineering consultant for advice. The construction of the proposed dam may be approved only if the following major criteria are satisfied.

(a). Is the identified need for the dam justified in terms of the availability of other water resources?
(b). Will the dam be able to meet the designated water demand?
(c). Can the dam be used to recharge groundwater
(d). Are the water requirements of downstream consumers accommodated?
(e). Is the design of the dam acceptable in terms of the stability and safety?
(f). What would the environmental consequences be?

New farm dams may not be constructed within the catchment areas of major bulk water supply dams. It requires convincing motivation to obtain approval for the construction of such farm dams because

the surface runoff must be allowed to reach the major dams that provide water for high priority domestic, industrial and mining developments. The same applies to water that must recharge aquifers and permits for the construction of farm dams in the Kuiseb Basin should not only be a topic of informed and collaborative discussion between the KBMC and the DWAF, but the KBMC should consider the possibility to find support and funding to make a formal environmental assessment about the existing situation in the basin in order to assess what the real impacts of the farm dam developments are and if there is scope for any further farm dam developments.

6.3 Groundwater

All groundwater comes from rainfall and if a groundwater source is recharged regularly (meaning it is not fossil water, which is not recharged at all) then the reliability and sustainable yield of the groundwater resource depend on the hydroclimatic conditions prevailing in the recharge area of the aquifer, the hydrogeological environment (the aquifer) and the quantity of water that will be abstracted between recharge events (DWA 1992).

The erratic climatic conditions make it very difficult to predict the recharge of groundwater sources in arid areas, but to enable the development of groundwater resources under these conditions, certain best estimates of the long-term sustainable yield are made by determining the aquifer parameters, through test pumping and taking the hydrological conditions into consideration. The aquifer parameters are the possibility of the particular geological environment to be recharged (the recharge coefficient), the storage capacity, or the volume of water which can be stored in the aquifer (storativity), and the rate at which the water moves through the aquifer (the permeability). After the sustainable abstraction has been estimated a water scheme is designed according to the available information, but the subsequent behavior of the resource under operational conditions is determined by monitoring and comparing the response of the resource to the theoretical assumptions about the recharge and abstraction. In this way the utilization of the source can be adjusted according to its actual long-term performance under the prevailing operational and climatic conditions. It can therefore be safely said that in the design of a borehole installation, the hydrogeological environment is adequately taken into consideration and the abstraction adjusted over time when it becomes necessary to protect sustainability.

If a borehole is drilled into a hard rock formation, such as most of the boreholes in the Kuiseb Basin, the water is normally found in a geological feature like a fracture or fault. The hydrogeologist will make an estimate of the aquifer parameters by doing a pumping test on the borehole to measure the drawdown of the water table, transmissivity, storativity and yield. The volume of stored water and the possible recharge, taking the erratic rainfall conditions into consideration, will also be considered, and in the final analysis the long-term sustainable safe yield of the borehole will be estimated. In some cases, where the boreholes will serve small communities or for animal watering, the cost to do a full scale hydrogeological investigation to determine the extent and capacity of an aquifer is not economical or affordable. In such cases it will be prescribed, as a rule of thumb, that the borehole should not be pumped at more than 65% of the test pumping yield, that the borehole should not be operated for more than 10 hours per day at the specified yield, that water levels should be recorded, abstraction be measured and a record should be kept of the rainfall in the recharge area of the aquifer.

The only proof of the accuracy of these best estimates obtained with scientifically collected information will become apparent when the borehole has been in use for a number of years and all the relevant parameters (quantity abstracted, fluctuations in water levels, rainfall received etc.) have been monitored. The accurate monitoring of boreholes over a long time is a prerequisite for sound aquifer management in arid regions.

The determination of the safe yield of alluvial aquifers in ephemeral rivers is less problematic than aquifers in hard rock geological structures. The volume of sediment in an alluvial aquifer can be measured relatively easily, and the volume of stored water determined fairly accurately. The volume of

water abstracted and the volume of water actually recharging the aquifer can be determined by measuring the fluctuations in the water levels, the runoff in the river and the recharge across the surface of the aquifer. By monitoring the behavior of such aquifers under operational conditions, the theoretically estimated sustainable safe yield of the system can be adjusted accordingly, as is the case in the Kuiseb Aquifers at the coast.

It is clear that in the long term, a borehole cannot supply more water than what is replaced by rainfall. All groundwater resources, which are recharged, are renewable water resources, but their sustainable yields or the quantity of water that can be abstracted over time, are finite in terms of the prevailing climatic conditions. By pumping water out of a borehole at a higher rate or over longer hours per day, will certainly yield more water in the short term, but the aquifer will then be depleted faster and the borehole will run dry. It also does not help to maintain the abstraction rate and keep to the specified number of hours per day, but drill more boreholes in the same aquifer, to get out more water. The short-term benefits of abstracting more water with more boreholes in the same aquifer will just deplete the aquifer faster. The bottom line is that groundwater in arid environments cannot yield more water than is replaced by nature, and therefore the magnitude of the groundwater source is finite.

Groundwater in the Kuiseb Basin is barely sufficient to supply the domestic, stock and industrial water demand. To use groundwater for irrigation or recreational purposes, is normally not sustainable in the long term and should not be encouraged, especially when higher priority demands are competing to be met from the same resources.

From the above, it is clear that groundwater sources are sensitive to exploitation and are exhaustible. Where they are replenished by natural recharge, they can be utilized for almost unlimited periods, provided that abstraction does not exceed the long-term recharge potential. Efficient management and the protection of these renewable sources are therefore of vital importance. This can be achieved when the hydrogeological environment is well understood, but reliable data about water levels should be available to measure the abstraction and estimate the recharge accurately. The water storage characteristics of the aquifers should be understood, the impacts of a reduced water table on the environment should be studied and an assessment should be made of the risks of climate change and the seasonal rainfall variability on the long term sustainability of an aquifer. Effective aquifer management can also be enhanced with modeling techniques, demand management and resource conservation.

A permit allocated to develop a groundwater source and to abstract water has conditions that require from the permit holder to provide information about the lithology of the geological formation in which the boreholes have been drilled, the quantity of water abstracted and the fluctuations in the water table, especially before and after the rainy season, in order to assist the DWAF to determine the behaviour of the aquifers under operational conditions and to improve the assessment of the sustainable potential of the aquifers.

6.4 Unconventional Water

In arid areas domestic sewage water and industrial effluent should be regarded as potential sources of water, which could be used conjunctively with other fresh water sources, or could replace the use of additional fresh water sources. This would enhance the integrated, optimal utilization of all water resources. In this regard, a distinction is made between the recycling, re-use and reclamation of water.

Recycling is the direct re-use of industrial effluent in the industrial or mining processes. The effluent is therefore not treated in any way after use, but re-used directly in a particular process. The Rössing Uranium Mine is an excellent example of an industry where the initial daily consumption of potable groundwater has been reduced by up to 60% as a result of the direct recycling of the mining effluent.

Re-use is the use of purified and disinfected domestic sewage effluent that has been treated to an acceptable standard for disposal, but is not of potable quality. This water is suitable for the watering of gardens, sports fields, golf courses and parks. The re-use of domestic effluent can serve as a major source of non-potable water. The golf course in Windhoek and the vegetable gardens that were in operation at Arandis are good example of how domestic sewage effluent can be put to good use.

Reclamation is when domestic sewage effluent is reclaimed and purified to drinking water quality standards. This is seen as an important additional source of water, especially in times of drought, when there may be severe limitations on the availability of other fresh water sources. The reclaimed water can also be mixed with purified water from the other fresh water resources.

As a result of the observation of natural phenomena and a research program to study the recharge mechanisms of alluvial and fractured rock aquifers in Namibia, artificial recharge enhancement and water banking were accepted as viable concepts. Artificial recharge is the infiltration of clarified surface water runoff into an aquifer. This achieved by impounding the runoff in a dam to allow the silt and colloidal material in the water to settle so that the clear water can be recharged into the aquifer under gravity. Water banking is the injection of purified raw water obtained from surface runoff collected in a dam. Examples are the Omdel Dam artificial recharge enhancement project and the Windhoek Aquifer artificial recharge water banking project.

The desalination of sea water and brackish groundwater is an example of the innovative use of non-conventional sources of water to meet water demands, especially in the Central Namib Area. It is estimated that new mining developments would soon increase the water demand beyond the capacity of the local water sources and the available water resources can be augmented effectively through the desalination. The most suitable desalination technologies for a specific type of water should be identified and implemented if the selected process would be economically feasible, but in all cases, the energy requirements are of critical importance. The capital investment and operating costs for desalination plants are normally too high to allow the use of the water for anything else than industrial and mining demand.

Better quality (potable) water used in industrial processes can also be substituted with brackish water or more saline water. As an example it can be mentioned that seawater is used for washing and cleaning purposes in the fishing factories in Walvis Bay, instead of using potable water.

Water demand management can be defined as an integrated approach towards the sustainable development of water supply infrastructure and the utilization of water resources. This involves the implementation of efficient water use practice, economic efficiency and protecting the water resource environment from over exploitation. Managing water demand can reduce the excessive consumption of water, delay the development of additional capital intensive water supply infrastructure and conserve scarce water resources.

A water awareness campaign should form part of a water demand management strategy to achieve effective water conservation in all sectors. The important components of a strategy to enhance the sustainable and conservative use of water would be to obtain public participation, to inform the public about practical measures to reduce water wastage and to conserve water, as well as to introduce punitive water tariffs to discourage high water consumption. If water is used more efficiently at the consumer point, less water has to be supplied from the primary water sources.

Water demand management is relevant to any water supply situation, but in arid areas the scarcity of water makes it an unavoidable imperative to utilize every drop of water to best advantage and maximum benefit. The allocation of a permit by the DWAF to abstract water should always be considered in consultation with the KBMC and against the background of more efficient water use, as well as the possibilities for water conservation and water demand management.

6.5 Water Quality

The potability of water is determined by its aesthetic (taste, smell, turbidity), chemical and bacteriological quality. Water from perennial or ephemeral rivers is generally of excellent chemical quality, but the runoff in the ephemeral rivers during the rainy season has high turbidity. In most cases the water in the large storage dams only requires clarification and disinfection to render it suitable for human consumption. In some cases the water may have unacceptable tastes and smells (For example at the Von Bach Dam) that must be removed in the water treatment process. Under prolonged drought conditions, the concentration of the total dissolved solids in the water in dams will start to rise as a result of evaporation and may render the water less suitable for certain industrial uses (For example in boilers).

The chemical quality of groundwater is determined by the abundance of rainfall and the chemical composition of the geological formations through which the groundwater percolates before it accumulates in an aquifer. The age of the water is also important, because it relates to the time that was available to dissolve the soluble rocks in an aquifer. Groundwater in arid regions tends to have elevated concentrations of dissolved solids that may, in some cases, render the water unfit for human and/or animal consumption. The detrimental constituents and their effect on health are indicated below:

(a).	Nitrates:	Methaemoglobinaemia
(b).	Sulphate:	Diarrhea
(c).	Fluoride:	Bone fluorosis
(d).	Chloride:	Taste, hypertension

An acceptable level of aesthetic and bacteriological quality for potable water can be achieved with an appropriate water treatment process, but it is more difficult to deal with unacceptable concentrations of dissolved solids. The chemical treatment of water with a high concentration of unwanted total dissolved solids is expensive, but this can be overcome by mixing the unsuitable water with suitable water to produce blended water with an acceptable quality.

Corrosive water or hard water may also cause damage to water supply equipment and needs careful consideration in the design of water treatment works and water supply infrastructure. The use of surface water or groundwater for irrigation in arid areas should be considered very carefully to avoid the salinization of the soil. Scientific analysis is called for to ensure that the chemical quality of the water and the available soil is compatible for irrigation purposes.

The required bacteriological quality of potable water can be achieved by disinfecting the water with chlorine or by using other methods, but the bacteriological quality of potable water should conform to the Namibian Water Quality Guidelines or the standards of the World Health Organization.

The allocation of permits to institutions (For example NamWater) that would abstract and supply water to their customers, should always prescribe the quality of the water to be supplied and the KBMC should be involved in a process of consultation regarding the allocation of such permits.

6.6 Waste Water Management

The treatment of domestic and industrial waste water is a very important issue in any arid country because the pollution of surface water, groundwater and the environment must be prevented. As much of the effluent as possible should also be reused in some way. Due to the absence of large quantities of water to flush pollutants from contaminated water resources, it is virtually impossible to restore the quality of such water resources once polluted. It is therefore a requirement that local authorities who must treat domestic sewage effluent and industries or mines that produce waste water or toxic waste water must be in possession of permit issued by the DWAF. The main purpose of the

permit is to prescribe how the effluents should be disposed of and to impose penalties for those institutions that do not comply with the permit conditions.

Domestic waste water in towns must be discharged from the individual premises into a sewerage system where the effluent is collected to be treated by the local authority at a central site. Smaller quantities of effluent can also be disposed of in oxidation dams and evaporation ponds instead of being treated. The treated water can be disposed of by means of evaporation in ponds or released into a public stream, if the quality of the effluent meets certain standards. Formal water-borne sewage disposal services are generally only rendered in urban areas and larger villages or at mining development sites and tourism centres in game parks. French drains and other appropriate sewage disposal methods are also used, but where there is a scarcity of water, the implementation of dry disposal systems should be investigated. It is the responsibility of certain Ministries, local authorities and the private sector to ensure that proper sanitation services are provided.

Industrial waste water may not be discharged into any public stream and must be treated in the same manner as sewage effluent, especially within urban areas and at mining sites. However, in cases where the quality of the industrial effluent is too toxic for treatment in normal sewage treatment works, the industrial concern must cater for its own wastewater treatment and disposal or it must dispose of the waste at a site prescribed and controlled by the local authority. The treatment and disposal of industrial and mining effluent in an area outside the control of a local authority must be done according to a permit which is issued by the DWAF in terms of the Act.

In view of the fact that the quality of industrial and mining effluent depends on the specific treatment process, the producer of the effluent must assist the DWAF by providing information about the quality of the waste water and to specify the treatment process proposed to dispose of the effluent to the satisfaction of the requirements of the DWAF in terms of the Act and any regulations. In the application for a waste water disposal permit it is required that a full environmental assessment should be done and the results submitted a part of the application. The proposed treatment process is then evaluated by the DWAF or the evaluation may be outsourced to a competent consultant that can advise the Ministry about the adequacy of the procedures proposed by the applicant to deal with the disposal of the waste water in such a way that there would be no unmanageable detrimental environmental effects.

7. Evaluation of Permit Applications

7.1 Introduction

This section will cover the procedures for the evaluation of permits for the abstraction and use of water, as well as the disposal of waste water according to the Water Act promulgated in 2004. The Water Act is at present under revision and some of the provisions in the Water Act will most probably change and many will become part of the regulations to be made under the Water Act.

7.2 Surface Water and Groundwater Abstraction

A person has the right to collect rainwater or to abstract water from a water resource or to dig a well by hand outside a local authority area or water management area to obtain water for domestic use and is exempted from the acquisition of a licence to abstract and use such water. However, a person may not abstract or use groundwater or surface water, including brackish or marine water for any other purpose than domestic use, except in accordance with a license issued under the Water Act.

A person who wishes to abstract and use water may apply to the Minister for a license to abstract and use water in the manner prescribed in the Regulations. The application must include:

(a). The name of the applicant;

(b). The names of owner and occupier of the land upon which the proposed beneficial use will be made;

(c). The water resource from which the proposed abstraction will be made;

(d). The proposed location of the abstraction;

(e). The type and location of the proposed beneficial use;

(f). The proposed rate and volume of the abstraction;

(g). The proposed timing of the abstraction;

(h). A description of any waterworks necessary to accomplish the proposed abstraction and a proposed schedule for the completion of such waterworks;

(i). A description of the proposed treatment that will be given to the abstracted water, including any chemicals proposed to be applied to the water;

(j). A description of the volume, rate and chemical composition of any effluent or return flow resulting from application of the abstracted water to beneficial use and a description of the place where any such effluent or return flow is expected to enter a water resource; and

(k). Any additional information the Minister may prescribe.

An applicant for a license to abstract and use water must, at least 60 days before the application is submitted to the Minister, issue a notice in the .Government Gazette to invite all interested persons to submit their objections within 30 days in writing, if any. The application must be accompanied by proof of the publication of the notice, the response from affected parties, representations by the applicant in support of the application in case of any objection and an environmental impact analysis of the proposed abstraction of water upon the water resources, the environment and existing water users as well as the prescribed fee.

Upon receipt of the application the Minister must refer the application to the basin management committee concerned for investigation and recommendations before a decision is made about the award of the permit or license. If there is no basin management committee established for the area concerned the Minister may take the decision. A basin management committee must:

(a). Investigate all matters pertaining to the application;

(b). Consider the objections and representations, if any;

(c). Make recommendations to the Minister.

After considering the recommendations of the basin management committee, the objections by interested persons, the representations of the applicant and the environmental impact analysis the Minister may grant the application to abstract water, with or without conditions, or deny the application. The applicant may appeal against the decision of the Minister and may file a notice of appeal to the Water Tribunal within 14 days of the decision.

A license to abstract and use water issued may be renewed and an application must be made at least three months prior to the expiry of the licensee.

The Minister may at any time review, amendment, suspend and cancel a license to abstract and use water if the licensee fails to abide by any of the terms and conditions of the license or fails to commence with the abstraction of water within the period specified in license or ceases with the abstraction of water for a continuous period of three years or if it is in the public interest to do so. However, before the Minister amends, suspends or cancels any license the licensee may make representations in respect of the proposed amendment, suspension or cancellation.

If a license to abstract and use water expires and is not renewed, or is cancelled, the Minister may require the licensee, at the licensee's expense, to remove any liens or other restrictions preventing the free use of the abstraction works, order the licensee to restore, at the licensee's expense, the state of affairs which existed before a license was issued, if doing so is reasonable and practicable under the circumstances; or enter into an arrangement with the licensee or any other person for the maintenance of an impoundment, abstraction infrastructure or effluent discharge works.

A license to abstract and use water may be leased to a third party under certain conditions specified in the Water Act. A license may be passes on to the named successor-in-title at the death of licensee or when a transfer is arranged, but that does not change the license conditions.

A license to abstract and use water does not guarantee the availability of water and the State is not liable if a licensee fails to obtain the permitted quantity of water, which may for example be as a result of drought or any other cause beyond the control of the State.

The Water Act provides for the control of groundwater development and if the holder of a permit to drill, construct, enlarge or otherwise alter a borehole or engage in a borehole drilling program for the purpose of exploring for groundwater has contracted another person to do the work required, then the permit holder or contractor must keep a record of the drillings and other operations carried out (such as test pumping) and furnish the Minister with the information provided by such drillings or operations.

7.3 Groundwater Development

A person who proposes to drill a new borehole, or to improve any existing borehole for the purpose of searching for minerals or other substances, or for road construction or for any purposes other than exploring for groundwater, must inform the Minister of such proposal, furnish the Minister with such data and information as the Minister may require in connection with such borehole drilling or improvement and take such measures as may be required by the Minister for conserving and protecting groundwater. Any excess water collected as a result of any activity related to the exploration for minerals, mining development or mining operations must be disposed of as prescribed by the Minister.

A person may not block or impede access to a state-owned borehole or borehole installation which is meant for public use and the Minister or water point committee concerned may summarily remove such blockage or impediment. The costs of removing any blockage or impediment may be recovered from the person responsible for the blockage or impediment.

A person may not cause or allow any groundwater to run to waste from any borehole, except for the purposes of determining the yield of the borehole or the quality of the water or when the borehole is cleaned, sterilized, or examined to be repaired, or if such water interferes or threatens to interfere with the execution of any underground mining operations or any other underground works, and no other method of disposing of such water is reasonably practicable.

The Minister has power to determine the safe yield of any aquifer for the purpose of allowing a certain quantity of water to be allocated for abstraction and may restrict or terminate the abstraction of water from an aquifer if the safe yield of the aquifer is exceeded. The safe yield is the amount of water that can be abstracted from an aquifer at a rate that will not be harmful to the hydrogeological environment or reduce the inflow into the borehole or affect the quality of the water.

The Minister may impose special requirements and restrictions with respect to artesian wells for the purpose of preventing water losses from the artesian aquifers, or the loss of artesian pressure; or wastage of water spilling out on the surface or the contamination of the aquifer water.

The Minister may also authorize programmes for the artificial recharge of, or the banking of water in aquifers.

A person may not engage in the trade of drilling boreholes or constructing wells unless such person is a licensed borehole driller or well constructor in terms of the Water Act. The Minister must prescribe the professional qualifications, as well as terms and conditions that should be complied with by any person who is issued with a license to practice as borehole driller or well constructor, including the circumstances under which a license may be cancelled or suspended.

7.4 Waste water

A person may not discharge any effluent directly or indirectly to any water resource on or under the ground, including through a borehole, or construct any effluent treatment facility or a waste disposal site above any aquifer unless the discharge of effluent or construction of the treatment facility or development of the disposal site is in compliance with a permit.

The Minister may exempt any person from obtaining a permit to discharge effluent from a septic tank, French drain or similar private sewerage facility, but may also withdraw any exemption or amend such an exemption by imposing new or further conditions, or by withdrawing certain conditions.

A person who wishes to apply for a permit to discharge effluent or to construct an effluent treatment facility or disposal site must submit an application to the Minister. The application must include

(a). The name of the applicant;
(b). The owner and occupier of the land or facility from which the proposed discharge will be made;
(c). The location of the proposed discharge;
(d). The location of the proposed effluent treatment facility, if any;
(e). The location of the proposed disposal site, if any;
(f). Any land, water resource, or environmentally sensitive area to which the discharged effluent will flow, directly or indirectly;
(g). The proposed volume and rate of the effluent discharge;
(h). The proposed duration of the discharge;
(i). The anticipated chemical composition of the discharge, including pathogenic organisms;
(j). The proposed treatment that will be applied to the effluent stream prior to discharge, including a description of any effluent treatment facility that will be constructed prior to commencement of the discharge; and
(k). Any such additional information that the Minister may prescribe.

An applicant for a permit to discharge effluents or to construct an effluent treatment facility or disposal site must, at least 60 days before the application is submitted to the Minister, issue a notice in the Government Gazette to invite all interested persons to submit their objections in writing within 30 days, if any. The application must be accompanied by proof of the publication of the notice, the response from the interested parties, if any, and the prescribed fee.

Upon receipt of an application for a permit, the Minister must give the applicant an opportunity to make representations in support of the application, if there were any objection made. The applicant must also conduct an assessment of the impact of the proposed effluent discharge or the proposed effluent treatment facility or disposal site upon the environment, including the owners and occupiers of land, as well as surface water and groundwater resources in the vicinity of the point where the proposed effluent will be discharged or the disposal site where the effluent treatment facility will be constructed.

The Minister may issue the permit to discharge effluent or to construct an effluent treatment facility or develop a disposal site, with or without conditions after considering:

(a). The contents of the application;
(b). The environmental impact analysis;
(c). The objections by interested persons, if any;
(d). Representations of the applicant, if any; and
(e). Compliance with the water quality criteria prescribed in the Regulations made in terms of the Water Act

The Minister, after consultation with competent authorities, may prescribe minimum standards of effluent quality with which effluent discharged must comply.

The duration of a permit to discharge effluent or to construct an effluent treatment facility or develop disposal site may not exceed a term of five years, but may be renewed. The permit holder must, at least three months prior to the expiry of the permit, submit an application for renewal to the Minister in the prescribed manner.

The Minister may, at any time during the duration of a permit to discharge effluent or to construct an effluent treatment facility or develop disposal site, review the permit and amend the terms and conditions if it is considered it to be in the public interest, but may invite the permit holder to make representations in respect of the proposed amendment.

The holder of a permit to discharge effluent or to construct an effluent treatment facility or disposal site may apply to the Minister for approval to transfer the permit to another person under certain conditions. The Minister, within 60 days of receipt of the application for transfer of a permit may grant the application, with or without additional conditions, or deny the application. At the transfer or death of a permit holder, the permit must pass to the successor-in-title of the permit holder, but the validity period of the permit will remain the same.

The Minister may cancel or suspend a permit in whole or in part, if the permit holder fails to comply with the provisions in the Water Act or any of the conditions of the permit, or fails to commence with the discharge or construction operations within the period stipulated in the permit or, after having commenced with the discharge of effluent or construction of an effluent treatment facility or disposal site, fails to discharge waste water or complete the construction work or if it is in the public interest to cancel or suspend the permit. The Minister may not suspend or cancel the permit without giving the permit holder an opportunity to make representations within 30 days of receipt of the notification of the Minister’s intention to suspend or cancel the permit.

If a permit to discharge effluent or to construct an effluent treatment facility or disposal site expires and is not renewed, or is cancelled prior to its expiry the Minister may order the permit holder to restore, at the holder’s expense, the state of affairs that existed before the permit was granted, if doing so is reasonable and practicable under the circumstances; or enter into an arrangement with the permit holder or any other person for the maintenance of the effluent discharge works or waste disposal site.

8. Discussion of Permit Conditions

8.1 Abstraction of Water

In deciding whether a license to abstract and use water should be issued, the Minister must consider the following criteria:

(a). Whether the proposed abstraction and use of water are consistent with the objectives and principles referred to in the Water Act (Sections 2 and 3 respectively), the National Water Master Plan; and any reservation of water for certain purposes (Section 27);

(b). The impact of the proposed abstraction upon existing water users, including uses by virtue of customary rights and practices, the stream flow regime, other existing and potential uses of the water resource, the sustainability of the water resources and the water reserved or allocated for environmental uses;

(c). The safe yield of the dam or perennial river or aquifer from which the abstraction is proposed;

(d). The conformity of the proposed use with the efficient water management practices;

(e). The need to redress the effects of past racial and gender discrimination;

(f). The likely effect of the proposed abstraction on the quality of any water resource, and on aquatic ecosystems dependent on the resource;

(g). The need to ensure the efficient and beneficial use of water resources;

(h). The existence of any traditional community and the extent of customary rights and practices in, or dependent upon, the water resource to which an application for the license relates; and

(i). Any additional criteria the Minister may prescribe.

The contents of a license to abstract and use water must specify:

(a). The person to whom the license is granted;

(b). The validity period of the license, which is not more than five years;

(c). The place of abstraction and use;

(d). The water use or uses the water is allocated for;

(e). The conditions of use, for example the specific volume of water which may be abstracted, the rate of abstraction, the time when water may be abstracted, the place where a dam may be built in watercourse, the volume of water which may be impounded and stored;

(f). Proper water management practices such as the preparation and approval of a water management plan, efficient water management, water use and conservation, the monitoring of uses, water levels and water quality, the proper discharge, treatment or disposal of any return flow or effluent;

(g) The fact that the license is subject to periodic review and to suspension, amendment or cancellation in accordance with the Water Act;

(h). The frequency of review and

(i). Any other conditions that may be required, such as that the licensee must become a member of a local water user's association, where appropriate, before water may be used.

8.2 Waste Water Disposal

The criteria for a decision to award a permit to discharge effluent or to construct effluent treatment facility or disposal site:

(a). Is the proposed discharge or construction is consistent with the Master Plan;
(b). What is the water into which the discharge will be made, used for;
(c). The standards for waterborne contaminants adopted by a competent authority;
(d). The impact of the discharge on existing water uses;
(e). The impact of the proposed effluent treatment facility or disposal site upon groundwater;
(f). Any impact of the proposed effluent discharge upon the environment, including owners and occupiers of land and water resources in the vicinity of the proposed effluent discharge or construction of effluent treatment facility or disposal site;
(h). The need to ensure the efficient and beneficial use of water resources; and
(i). Any additional criteria the Minister may prescribe.

A permit to discharge effluent or to construct an effluent treatment facility or disposal site must specify:

(a). The person to whom the permit is granted;
(b). The location of the discharge;
(c). The location of the effluent treatment facility or disposal site;
(d). The limits of any constituent elements of the discharge;
(e). Requirements for waterproofing or covering the effluent treatment facility or disposal site;
(f). The validity period of the permit;
(g). The conditions subject to which the permit is granted;
(h). The frequency of review of the permit; and the fact that the permit is subject to periodic review and to suspension, amendment or revocation under this Act.

A permit to discharge effluent or to construct an effluent treatment facility or disposal site is issued subject to the protection of any water resource to which the discharge will be made as well as any existing or potential uses of the water resource, including environmental uses, by specifying the volume of effluents that may be discharged, the rate of discharge, concentration of certain substances in the effluent, the time, if any, when effluents may not be discharged, the location where a discharge may, or may not be made and adding any such terms regarding the protection of the water resource which the Minister determines to be appropriate.

The object is the protection of any water resource, including ground water, in the vicinity of the effluent treatment facility or disposal site, by specifying the location of the effluent treatment facility or disposal site, limiting the type, volume, composition or concentration of effluent discharged by the effluent treatment facility or stored in a disposal site, specifying the requirements for lining or covering the effluent treatment facility or disposal site, the requirements for operating, managing and closing the effluent treatment facility or disposal site; and adding any such terms for the protection of residents, water users or water resources in the vicinity of the effluent treatment facility or disposal site which the Minister determines to be appropriate.

The Minister must also ensure proper effluent discharge management. The Minister prescribe and specify in the permit the monitoring, analysis and reporting on every discharge, the quality of the

discharge to be monitored and reported on, as well as the devices to be used for such monitoring, including the need for an effluent discharge management plan, the protection of public health and the payment of charges.

9. Other provisions in the Water Act

9.1 Protection of Water Resources

The Minister, by notice in the Government Gazette, may declare an area as water management area for the purpose of protecting any water resource, riverine habitat, watershed, wetland, environment or ecosystem at risk of depletion, contamination, extinction or disturbance from any source, including aquatic and terrestrial weeds. The notice must include a description of the purposes for which the area is so declared, the geographic boundaries of the area, as well as the limitations and prohibitions applicable within the area. The Minister may not declare any area as a water management area without giving the owners or occupiers of land within a proposed water management area the opportunity to make representations regarding the need for the water management area, the proposed boundaries of the area or the land use limitations and prohibitions proposed for the area.

The boundaries of any water management area must be determined in a manner that takes competing uses of the area concerned into consideration and, if the declaration of a water management area results in or requires the acquisition of land through expropriation, every such acquisition, including the award of compensation and appeals related thereto must be conducted in accordance with the law on the expropriation of property in the public interest.

A person may not undertake or cause any activity to be undertaken that impairs or conflicts with the purposes for which a water management area is declared. The Minister may prescribe limitations to be observed within a water management area, such as a prohibition or limitation on the abstraction of water, the erection of any structures, the application or storage of any chemicals, including pesticides or fertilizers the alteration of existing land contours, including any grading or construction of roads or the cultivation of crops or the clearing or harvesting of vegetation, including the felling of trees, or the removal of riparian growth or the draining of wetlands, or the use of wetland resources, the discharge of effluent, the mining, dredging or the reclamation of land and necessary for the protection of a water resource.

If a limitation is imposed that will affect existing licenses or permits issued under this Act, the limitation must, to the extent possible, be assessed and distributed proportionately among all affected license or permit holders, as the case may be.

The Minister may, by notice in the Government Gazette, amend the geographic boundaries of a water management area, or any prohibition or limitation applicable to the area, if circumstances in respect of the area change or so require; or withdraw a declaration of a water management area if the circumstances under which the declaration was made no longer exist.

9.2 Efficient Water Management

The Minister must prescribe procedures on how to develop and adopt efficient water management practices that minimize wastage of water, encourage efficient water use and advance the control of pollution, either for regions in general or for a specific region, or for any area defined by the Minister. In prescribing procedures as to how to develop and adopt efficient water management practices the Minister must consult public and private institutions dealing with environment and water, and water users concerned, and may consider any measures consider necessary.

The Minister must undertake periodic reviews of water users throughout Namibia to determine their compliance with the efficient water management practices. If a water user fails to comply with efficient water management practices, the Minister must issue a notice of non-compliance to the non-compliant water user requesting the user to take corrective measures within a period specified in the notice which period may not exceed 60 days from the date of receipt of the notice. If the non-compliant water user fails to comply with the notice, the Minister may cancel or suspend the license, if the user is licensed, or impose monitoring and such other measures which the Minister determines to be appropriate in the circumstances. The Minister may not take any decision under subsection without affording the water user and any other interested persons the opportunity to show cause why a license may not be suspended or cancelled or monitoring measures and such other measures may not be imposed.

A water user or any interested person who is not satisfied with the decision made by the Minister may file a notice of appeal to the Water Tribunal within 14 days from the date the decision was made.

A water user who has conserved irrigation water by successfully applying efficient water management practices may apply to the Minister to transfer such water, except groundwater, to another person. Upon receipt of the application, the Minister must consider whether the terms and conditions of the proposed transfer is consistent with the terms and conditions of the conservation of irrigation water, any deviation from the terms and conditions of the license to abstract and use water that may impact adversely upon other persons and the environment and the purposes for which water will be used by the new user. The Minister, within 60 days of receipt of the application, may grant the application, with or without additional conditions, or deny the application.

10. Conclusions

From the above it is clear that the KBMC can play an important role in assisting the DWAF to implement water legislation efficiently if they are afforded the opportunity to participate in the decision-making about the award of licenses and permits for the allocation and use of water or the disposal of waste water. The KBMC is therefore advised to approach the DWAF and to insist that full collaboration must be implemented between the parties to protect the interests of the local stakeholders in the water and environmental resources of the basin. This could be achieved with a formal Memorandum of Understanding or an Agreement between the Parties.

The KBMC is advised to approach the DWAF to brief them on the progress with the revision of the Water Act and even to comment on the draft regulations to be made in terms of the Water Act.

The KBMC should request the DWAF to inform them about the interpretation and implementation of the Water Act by means of an appropriate training workshop where all Parties and stakeholders can be aware of and understand how the Water Act will be implemented and what contribution can be made by the KBMC to ensure the proper implementation of and compliance with the legislation.

In this regard there may opportunities to solicit funding for the proposed workshop or perhaps the appointment of a consultant to provide the briefing about the legal and technical implementation of the Water Act

11. REFERENCES

Christelis, G. *et al* (2001) Groundwater in Namibia. An explanation of the Hydrogeological Map.

DWA (1956) The Water Act, 1956 (Act54 of 1956) as made applicable in South West Africa.

DWA (1971a) Regulation No R1277 dated 12 July 1971.

DWA (1971b) Regulation No R1278 dated 12 July 1971.

DWA (1991) Water Supply and Sanitation Policy Committee. Recommendations on a Future Water Supply and Sanitation Policy for Namibia. Government of Namibia, June 1991.

DWA (1993) A Digest of the Water Supply and Sanitation Policy of the Republic of Namibia. Department of Water Affairs, November 1993

DWAF (2008) The Water Supply and Sanitation Sector Policy.

MAWRD (2000) National Water Policy White Paper. Ministry of Agriculture, Water and Rural Development. August 2000

MAWRD (2004) Water Resources Management Act, 2004 (Act 24 of 2004)

DWA, (1992) Criteria to be Considered when Allocating Permits for the Abstraction of Groundwater for Irrigation Purposes in the Karst Area. Compiled by the Geohydrology Division, Department of Water Affairs, Ministry of Agriculture, Water and Rural Development. November 1992.

DWA, (2002) Hydrogeological Investigations to Determine the Groundwater Potential of the Tsumeb Aquifers in Norhern Namibia (The Tsumeb Groundwater Study). Compiled by GKW Consult and Bicon Namibia, for the Department of Water Affairs, Ministry of Agriculture, Water and Rural Development. February 2002.

DWA, (2004) Revised Criteria to be Considered when Allocating Permits for the Abstraction of Groundwater for Irrigation Purposes in the Tsumeb-Grootfontein-Otavi Subterranean Groundwater Control Area. Compiled by the Geohydrology Division, Department of Water Affairs, Ministry of Agriculture, Water and Rural Development. June 2004.