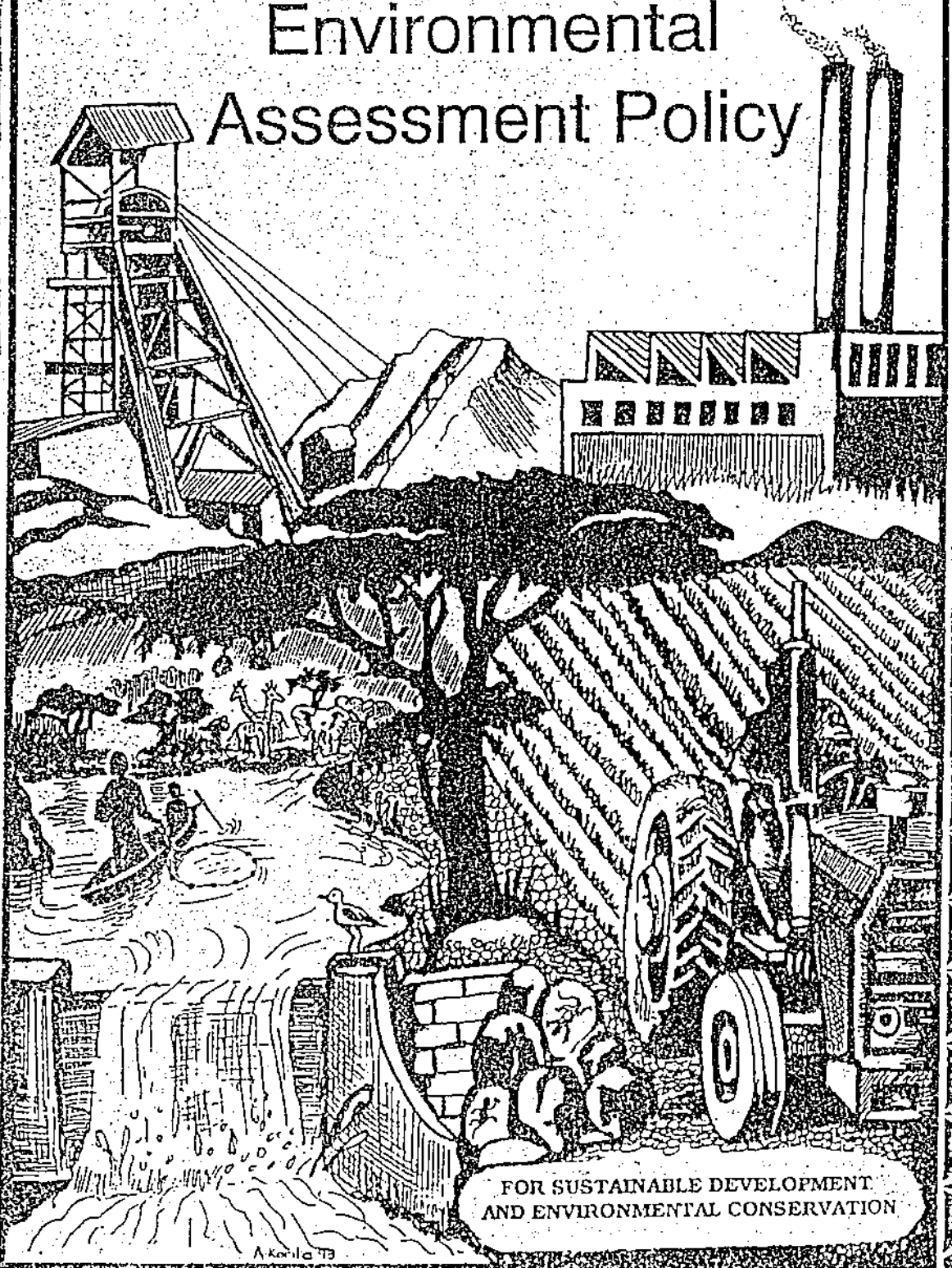
APPENDIX A

Namibia's Environmental Assessment Policy

REPUBLIC OF NAMIBIA

NAMIBIA'S Environmental Assessment Policy



FOR SUSTAINABLE DEVELOPMENT AND ENVIRONMENTAL CONSERVATION

NAMIBIA'S ENVIRONMENTAL ASSESSMENT POLICY

JANUARY 1995

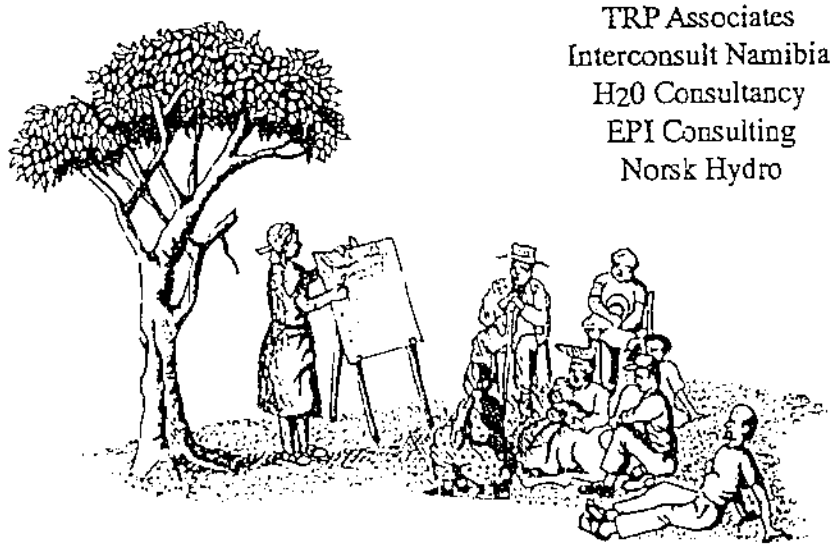
Compiled and edited by :

Directorate of Environmental Affairs
Ministry of Environment and Tourism,
Private Bag 13306 , Windhoek

In consultation with:

National Planning Commission
Ministry of Mines and Energy
Ministry of Agriculture, Water and Rural Development
Ministry of Fisheries and Marine Resources
Ministry of Lands, Resettlement and Rehabilitation
Ministry of Education and Culture
Ministry of Trade and Industry
Ministry of Defence
Ministry of Local Government and Housing

Norwegian Agency for International Development
Swedish International Development Agency
University of Cape Town
Technikon Namibia
Chamber of Mines
Engineering Professional Association
Legal Assistance Centre
Wildlife Society of Namibia
Namibia Nature Foundation
Desert Ecological Research Unit of Namibia
Walmsley Environmental Consultants
Loxton Venn and Associates
Environmental Evaluation Associates of Namibia
TRP Associates
Interconsult Namibia
H_2O Consultancy
EPI Consulting
Norsk Hydro



PREAMBLE

THE GOVERNMENT OF THE REPUBLIC OF NAMIBIA

RECOGNIZES THAT :

1. "The State shall actively promote and maintain the welfare of the people by adopting policies aimed at ...

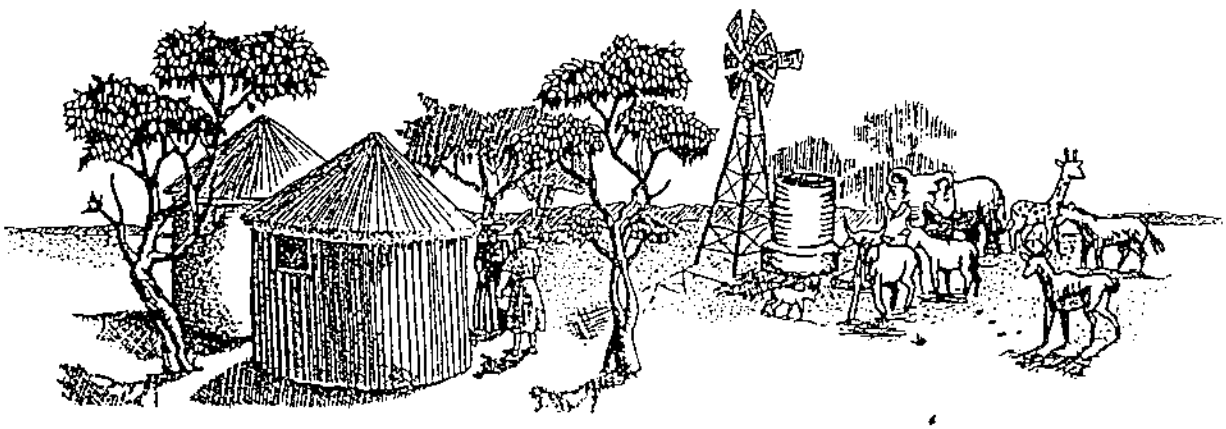
   The maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of living natural resources on a sustainable basis for the benefit of all Namibians, both present and future ..." [Constitution of the Republic of Namibia - Art 95 (l)].

2. There is an urgent and fundamental need for economic development, foreign investment and the alleviation of poverty [Namibia's Green Plan - chapter 11 (j)].

3. Namibia has inherited a colonial legacy of institutionalised segregation which has led to economic disenfranchisement and contributed to general environmental degradation and habitat destruction in certain areas [Namibia's Green Plan - chapter 11 (j)].

4. Namibia is dependent on natural resources and certain biophysical components are vulnerable to environmental degradation. It is specifically acknowledged that Namibia is an arid country and that the scarcity of water and the country's limited human and animal carrying capacity need to be taken into account prior to policy formulation and during all stages of planning.

5. Environmental Assessments are a key tool, amongst others, to further the implementation of a sound environmental policy which strives to achieve Integrated Environmental Management (IEM).



NAMIBIA 'S ENVIRONMENTAL ASSESSMENT POLICY

The Government of Namibia :

RECOGNIZING that Environmental Assessments (EA's) seek to ensure that the environmental consequences of development projects and policies are considered, understood and incorporated into the planning process, and that the term ENVIRONMENT (in the context of IEM and EA's) is broadly interpreted to include biophysical, social, economic, cultural, historical and political components;

DECLARES the following ENVIRONMENTAL ASSESSMENT policy for Namibia :

1. All listed policies, programmes and projects, whether initiated by the government or the private sector, should be subjected to the established EA procedure as set out in Appendix A. A list of policies, programmes and projects requiring an EA is set out in Appendix B.

2. The EA procedure will, as far as is practicable, set out to :

(i) better inform decision makers and promote accountability for decisions taken;

(ii) consider a broad range of options and alternatives when addressing specific policies, programmes and projects;

(iii) strive for a high degree of public participation and involvement by all sectors of the Namibian community in the EA process;

(iv) take into account the environmental costs and benefits of proposed policies, programmes and projects;

6.1 The Environmental Commissioner shall be responsible for administering the EA process as described in Appendix A. This will include registration, establishing the procedural framework for the process in consultation with the proponent, screening, evaluation and review procedures as appropriate.

6.2 The Environmental Commissioner shall report to an Environmental Board which shall be constituted in terms of the Environmental Assessment Act, and shall consist of senior representatives from various Ministries and other organisations as appropriate. The Board shall be vested with powers to co-opt individuals and specialists where required. In addition to initial screening, the Board shall be responsible for reviews so as to ensure that EA's are of a consistently high standard.

7. Decisions taken by the Commissioner and/or the Board shall be subjected to appeals according to the normal legal principles and appeal procedures in Namibia.

8. A record of all decisions by the Board shall be kept. Such records, as well as EA reports, shall be registered, accessible and available for public enquiry. The proponent will however, have the right to request confidentiality on specific information as appropriate.

9. The EA procedure will, at the cost of the proponent, include the ongoing monitoring of policies, programmes and projects after they have been implemented, to ensure that they conform with the recommendations in the EA report as well as the agreement between the proponent and the Environmental Board.

APPENDIX A CONTINUED ...

ENVIRONMENTAL ASSESSMENT PROCEDURE

1. SUBMISSION OF POLICY, PROGRAMME OR PROJECT

This is the start of the process, when the proponent (be it government or private enterprise), submits a proposal to the Environmental Commissioner, located in the National Planning Commission.

2. REGISTRATION

The Environmental Commissioner officially registers the policy, programme or project proposal, and ensures that the proponent fully understands the EA procedure which needs to be followed. The Commissioner supplies the proponent with the necessary documentation, general guidance, contacts, and any other support which will facilitate a smooth EA process.

3. DEVELOP PROPOSAL

Because Environmental Assessments are designed to, *inter alia*, (a) facilitate integrated and improved planning during all stages and (b) ensure that the decision making process is informed and streamlined, the following steps are required at the earliest stage:

- → notify neighbours and other interested and affected parties,
- → establish policy, legal and administrative requirements and procedural framework,
- → establish the need for the development, and evaluate this against local, national and international needs on various time scales,
- → notify and consult with interested and affected ministries,
- → identify and consider alternatives,
- → identify and consider issues, opportunities and constraints of alternatives,

(i) Scoping

This determines the extent of and approach to the investigation, and should endorse the Terms of Reference established earlier. The proponent (and his/her consultant), in consultation with the Environmental Commissioner, relevant authorities, interested and affected parties, determine which alternatives and issues should be investigated, the procedural framework that should be followed, and report requirements. It is the responsibility of the proponent to ensure that all the above are given adequate opportunity to participate in this process.

The Scoping process should indicate the following:

- → the authorities and public that are likely to be concerned and affected,
- → methods to be used in informing and involving concerned and affected parties,
- → opportunities for public input,
- → specific reference to disadvantaged communities regarding the above,
- → the use of advisory groups and specialists,
- → the composition of the EA team and their Terms of Reference,
- → the degree of confidentiality required.

If the proposal is likely to affect people, the proponent should consider the following guidelines in Scoping:

- → the location of the development in relation to interested and affected parties, communities or individuals,
- → the number of people likely to be involved,
- → the reliance of such people on the resources likely to be affected,
- → the resources, time and expertise available for scoping,
- → the level of education and literacy of parties to be consulted,
- → the socio-economic status of affected communities,

→ Incomplete or unavailable information

→ Conclusions and recommendations

→ Definitions of technical terms

→ List of compilers

→ Acknowledgements

→ References

→ Personal communications

→ Appendices

It should also include :

→ Management plan

→ Monitoring programme

→ Environmental Agreement

→ Audit proposal

6. NO FORMAL ASSESSMENT

If a policy, programme or project is unlikely to result in significant impacts, and plans for maximizing benefits are adequate, then the proposal can proceed without an EA. In the unlikely event of strong opposition to the development at this late stage, the Commissioner could solicit further opinions from specific ministries, specialists, interested and affected parties and the general public. Based on the response, the proposal is either sent back for more information (especially if there is serious uncertainty or significant information gaps), or approval to proceed is confirmed.

7. REVIEW

Once completed, an Environmental Assessment report is submitted to the Environmental Commissioner for review. The Commissioner will review the document with the assistance of local and/or outside experts, sector Ministries, and any other

12. MONITORING

An appropriate monitoring programme should be required for all approved proposals. Aspects to be covered in Monitoring include verification of impact predictions, evaluation of mitigatory measures, adherence to approved plans, and general compliance with the Environmental Agreement. The responsibility for ensuring that appropriate monitoring takes place lies with the Commissioner, while the proponent shall be responsible for meeting the costs.

13. AUDITS

Periodic assessments of the positive and negative impacts of proposals should be undertaken. These will serve to provide instructive feedback on the adequacy of planning during the **Develop Proposal** stage, the accuracy of investigations in the **Environmental Assessment** stage, the wisdom of the decisions taken during the **Review** stage, and the effectiveness of the **Conditions of Approval** and **Monitoring Programme** during the **Implementation** stage. An audit is thus an *independent* reassessment of the policy, programme or project after a given period of time.

13. Electrical substations and transmission lines having equipment with an operating voltage in excess of 30 000 volts rms phase-to-phase.
14. Storage facilities for chemical products.
15. Industrial installation for bulk storage of fuels.
16. Bulk distribution facilities.
17. Manufacture of explosives.
18. Introduction and/or propagation of invasive alien plant and animal species.
19. Afforestation projects.
20. Genetic modification of organisms & releases of such organisms.
21. Major roads.
22. Railways.
23. Commercial aerodromes.
24. Ports and harbours.
25. Major pipelines.
26. Cableways and cableway stations.
27. Television and radio transmission masts.
28. Major canals, aqueducts, river diversions and water transfers.
29. Permanent flood control schemes.
30. Major dams, reservoirs, levees and weirs.
31. Establishment of armaments testing areas.
32. Reclamation of land from sea.
33. Major agricultural activities (e.g. livestock and cultivation projects in previously undeveloped/unused areas).
34. Small scale (formal) water supply schemes.
35. Human resettlement.
36. Water intensive industries.

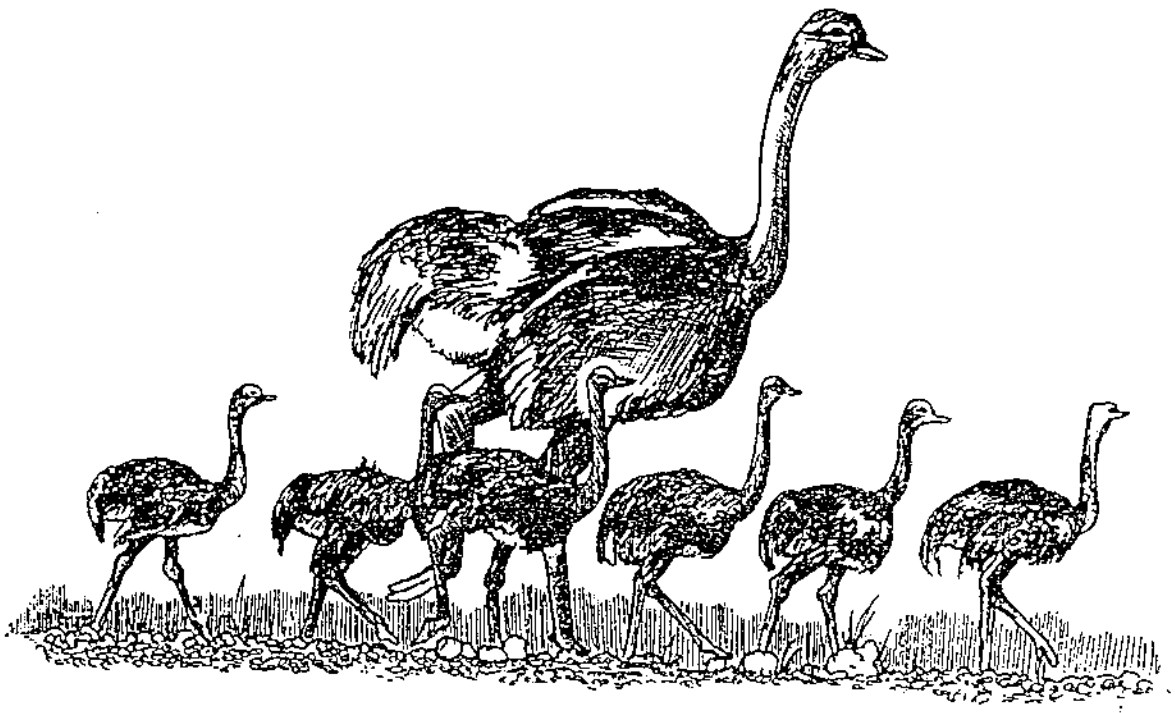
ACKNOWLEDGEMENTS

This draft policy is the product of vast experience drawn from experts in various fields, all of whom made significant contributions during and after the preparatory workshop which was held in September 1992.

Dr. Christopher J. Brown, Head of the Directorate of Environmental Affairs in the Ministry of Environment and Tourism, provided constant support and leadership, and commented on earlier drafts of this policy.

In particular, the assistance and guidance of Dr. Guy Preston, Ms. Shirley Grindley, Ms. Fareida Khan and Mr. Jan Glazewsky, all from the University of Cape Town, were most valuable.

The Norwegian Agency for International Development (NORAD), provided sponsorship for the workshop.



APPENDIX B

Guidelines for Environmental Assessments for New Boreholes *(Draft)*

File Number: 20/13/2

REPUBLIC OF NAMIBIA

MINISTRY OF AGRICULTURE, WATER AND RURAL DEVELOPMENT

DEPARTMENT OF WATER AFFAIRS

GUIDELINES FOR ENVIRONMENTAL ASSESSMENTS FOR NEW BOREHOLES

DRAFT

THE DEPUTY PERMANENT SECRETARY
DEPARTMENT OF WATER AFFAIRS
Private Bag 13193
WINDHOEK

COMPILED BY:
WATER ENVIRONMENT DIVISION

Contents

1. INTRODUCTION

The provision of improved water supply to rural communities is the first priority of the Water and Sanitation Policy guidelines of the Government, which were approved by Cabinet in September 1993.

Water provision should contribute to improved public health, reduce the burden of collecting water and promote social and economic development. Overall, the provision of water needs to promote sustainable development and water use.

It is widely recognised that water provision has both positive and negative environmental consequences. For this reason environmental assessments, (that include cultural, social, economic and biophysical evaluations) should be conducted for major water development schemes, including new boreholes.

This document is a first attempt at providing guidelines for the environmental assessment that should be conducted prior to providing boreholes for the supply of water for domestic use and livestock watering in rural areas. Namibia's new environmental legislation is nearing completion and although the environmental assessment policy should be followed, some of it's structures and processes are not yet in place.

Water provision in new areas has major consequences for national development and the environment, which are irreversible. For this reason these schemes in particular need to be planned initially through a process of consultation and consensus at all levels. For the purposes of these guidelines, it is assumed that this essential initial phase, that of national land use planning for a particular area, has been completed.

However the reality of the matter is that environmental assessments are funded for particular development schemes with mitigation of undesirable consequences the principal aim. These data often provide the only information on which to base decisions on alternative land use options for future integrated environmental management. Thus the consultants also have the responsibility, as far as possible, to address wider issues that may concern regional planning.

Environmental consultants should make sure that all environmental aspects, including those in these guidelines, are covered in their investigations and report.

2. THE SCOPE OF EIA"S OF NEW BOREHOLE SCHEMES.

When the EIA policy is fully in place, the decision of what should be included in an environmental assessment and whether one is necessary at all will be made by the Environmental Board. The present land use in the area in which the planned borehole is requested will determine the scope of the environmental assessment.

The actual drilling of a borehole may have long term positive or negative impacts, but it is frequently how the new water resource is managed, that will determine whether or not the initial benefits are sustainable. In many places desertification, which is the degradation of land, is a great concern. Water provision without suitable environmental management being major contributing factors.

The environmental aspects that need to be considered when boreholes are planned in new areas therefore need to address the subsequent sustainability of natural resources and social development in the area as well as the actual siting and drilling phase.

3. EIA'S FOR BOREHOLES IN AREAS WHERE SUBSEQUENT LAND USE WILL REMAIN THE SAME.

If the request is for a borehole to improve the water supply to an established community, where land use is entrenched, then the EIA can be reduced in scope. Emphasis of the assessment should be to:-

1. Establish the need for the borehole and the alternatives.
2. Investigate social aspects. Emphasise community consultation and participation at all stages of the development (for instance the potential conflicts between local diviners and geohydrologists, decisions on the type of pump, explaining cost and maintenance implications).
3. Assess the willingness for the transfer of responsibility for the operation and maintenance of the borehole and equipment to the community.
4. Assess the understanding of the need for the community to manage natural resources such as local grazing and the use of the water, and its commitment to establish community structures to manage these aspects.
5. Make sure that Pumping tests and pump type and size correspond so that subsequent water use is sustainable and that monitoring of water levels can and will be done.
6. Investigate how local land use might change as a result of the borehole.

4. EIA'S FOR BOREHOLES IN AREAS WHERE SUBSEQUENT LAND USES WILL CHANGE.

Requests for boreholes in new areas where there are no present settlements or where these are seasonal will require a thorough environmental assessment.

Subsequent changes in land use and settlement have in the past often led to land degradation and reduction of biodiversity and the development is unsustainable.

The assessment should follow the normal EIA procedures of:-

1. Scoping with I&AP's,
2. Establishment and evaluation of need for the project with respect to alternative land uses.
3. Investigation of biophysical and social aspects including the following.

3.1 National and Regional interests

a) Future development options.

b) Other planned water developments.

c) Impact on sustainable use of natural resources.

d) Sites of special scientific interest.

e) Impact on population demographics.

f) Aesthetic qualities of landscape.

g) Impact on food security.

3.2 Social issues

a) Cultural and traditional constraints.

b) Age and gender issues.

c) Degree and type of community organisation.

d) Authority structures.

e) Growth rate of local populations.

f) Adequacy of local services.

g) Settlement patterns and migration.

h) Relocation of people and livestock.

i) Land and resource tenure considerations.

j) Traditional landuse patterns.

k) Dependence and use of natural resources.

l) Privatisation.

m) Employment situation.

n) Public health, safety and social services.

o) Altered access to schools, clinics, and other services.

p) Theft, poaching, vandalism.

3.3. Plants and animals.

a) Water availability to animals

b) Biodiversity and community organisation.

c) Rare, endangered or important species and habitats.

d) Change in habitat structure.

e) Spread or introduction of invasive species or disease vectors.

f) Bush encroachment.

g) Trampling , desertification.

h) Harvesting of natural resources and over-exploitation

3.2 Soil/land.

a) Landuse patterns

b) Erosion

c) Seed banks

d) Soil moisture.

e) Soil compaction.

f) Proliferation of informal tracks.

g) Land clearing.

5. EVALUATION AND REPORTING

The report should include **strong, clear** and **concise** recommendations for the **actions** that should be taken, with an indication of the organisation responsible.

6. ENVIRONMENTAL CONTRACT.

The consultants should facilitate and initiate the drawing up an environmental contract or document of commitment, which is a requirement of the EIA policy, with the help of the Department of Environmental Affairs and the Department responsible for the operation of the development.

APPENDIX C

Guidelines for Environmental Assessments for Large Irrigation Projects

File: 10/12/2/6/3

REPUBLIC OF NAMIBIA

MINISTRY OF AGRICULTURE, WATER AND RURAL DEVELOPMENT

DEPARTMENT OF WATER AFFAIRS

GUIDELINES

FOR

ENVIRONMENTAL ASSESSMENTS OF LARGE IRRIGATION PROJECTS

THE DEPUTY PERMANENT SECRETARY
DEPARTMENT OF WATER AFFAIRS
Private Bag 13193
WINDHOEK
Namibia

MAY 1993

CONTENTS

1. INTRODUCTION

1.1 PURPOSE OF THE GUIDELINES

The purpose of these guidelines is to describe the requirements for an environmental assessment for large irrigation projects, particularly those requiring permits from the DWA to abstract water from any groundwater source in a water control area, or State dam or perennial river. They are intended to be sufficiently broad to allow ready adaptation to different types of large irrigation projects.

These Guidelines are designed to contribute to the sustainable use of the Namibian environment through the appropriate use of water and the activities surrounding irrigation. In this way, an attempt is made to encourage sustainable, economically viable and environmentally sound planning and operation of large irrigation projects.

1.2 ENVIRONMENTAL PERSPECTIVE

Chapter 11 of the Constitution of the Republic of Namibia deals with the Principles of State Policy and in particular promotes the welfare of the people in Article 95 which stresses the importance of maintaining natural ecosystems, ecological processes and the diversity of plants and animals, as well as sustainable utilization and the wise management of natural resources for the benefit of present and future generations. In keeping with this, one of the objectives of the Department of Water Affairs (DWA) is to ensure that the available water resources in Namibia are utilized on an equitable, sustainable and environmentally sound basis.

As with many development projects, large irrigation schemes can have both local and far-reaching environmental effects. At present there is no legal requirement for environmental assessments for such projects. In the absense of appropriate legislation, the DWA is obliged to, at least, provide guidelines for such assessments and to encourage developers to consider them in their planning and evaluation of large irrigation projects. For the purposes of this document, a large irrigation project is defined as having an area of more than 9 ha under irrigation or consuming more water than 100 000 m^3 /a.

At present, permits must be obtained for the abstraction of groundwater from water control areas, from State dams and from perennial rivers. The Department requires that an entrepeneur must apply for a permit to abstract water for irrigation and the applications are mainly assessed in terms of economic viability, soil conditions and water availability. Such projects were subject to approval by the Water Board which, in turn, was advised by the Hydrology, Geohydrology and Planning Divisions of the DWA.

Now, in keeping with increasing environmental awareness world-wide and the realization of the need for sustainable utilization of natural resources and sound development, the DWA requests water abstraction permit seekers to take into consideration the environmental consequences of proposed large irrigation projects.

In future, environmental assessments will form an integral part of all applications for water abstraction permits for large irrigation projects. The results of these environmental assessments will enable the Research Division of the DWA to advise the Water Board on the environmental feasibility of proposed irrigation projects.

Broadly defined, the term **environment** includes biological, physical, social, economic, cultural, historical and political considerations. An environmental assessment should look at all these aspects, their inter-relations, short-, long-term and cumulative impacts, local impacts as well as distant ones, e.g. in the case of water abstraction from a perennial river, downstream impacts are often more important that any at the site of abstraction.

All irrigation project entrepeneurs are strongly urged by the Ministry of Agriculture, Water and Rural Development to conduct environmental assessments, based on these Guidelines, as part of the investigations required to assess the viability of the proposed projects, whether they are considered small or not, requiring water abstraction permits.

1.3 PURPOSE OF THE ENVIRONMENTAL ASSESSMENTS

The purpose of environmental assessments are to identify the environmental

consequences of development projects, in this case, of proposed large irrigation projects, and to ensure that these are given due consideration throughout the planning, implementation and operation of the project.

The extent and detail of the environmental assessment required would depend on the size, nature, location and operation of the proposed irrigation project and the extent of any assessment will be decided in consultation with the DWA, who may also solicit advice from other Ministries.

1.4 RECOMMENDED PROCEDURE FOR ENVIRONMENTAL ASSESSMENTS

The procedure for environmental assessments for large irrigation projects recommended in these Guidelines is based on the Integrated Environmental Management (IEM) method which divides environmental assessments into the proposal, assessment, decision, implementation, monitoring and re-evaluation phases. This method of determining potential environmental impacts aims to promote sustainable development and facilitate environmentally-sound decision making. IEM, allows public participation, ensures the consideration of alternatives, evaluates costs, seeks to minimize detrimental effects and maximize environmental benefits. This method should produce environmentally sound quidelines for decision making throughout the planning, implementaton, monitoring and management phases of the proposed irrigation project.

2. GUIDELINES FOR ENVIRONMENTAL ASSESSMENTS

2.1. THE PROPOSAL

The first step when tackling an environmental assessment is to draw up a proposal giving all the relevant information on the proposed project and the current perceived status of the environment. It is suggested that a draft preliminary proposal be drawn up using the guidelines given below and that this be discussed with the Department of Water Affairs before a formal proposal is submitted.

2.1.1 The Proposed Irrigation Project

Briefly describe the proposed irrigation project including:

a) overall description, need for the project, predicted benefits of the project and alternatives to the project
b) comparative advantages and disadvantages of the project and alternatives including the no-project alternative
c) how the project fits into regional and national development plans
e) contributions of other sectors to the proposed development
f) essential conditions for project implementation
g) basic assumptions underlying project success
h) economic benefits as determined by an economic cost/benefit analysis
i) how the project will enhance or constrain future development options.

2.1.2 The bio-physical and socio-economic environment

Briefly describe the bio-physical and socio-economic environment, for areas affected by the project, directly and indirectly, paying particular attention to the area surrounding the project site and to rivers and aquifers downstream of the proposed draw off, or abstraction point including the river mouth or delta region, include:

a) climate, geological and soil conditions
b) hydrological conditions
c) present biodiversity - checklists of plants and animals in the area and downstream
d) existing use of areas and natural resources affected by the project
e) rare and endangered species and habitats
f) unique cultural or natural areas including areas of special historic, archaeological,
cultural, aesthetic or scientific value
g) demographic, settlement and socio-economic patterns;
h) health situation, particularly water-born disease
i) project target group
j) affected local and national populations
k) previous impacts in the area
l) existing degradation and underlying causes
m) current and potential tourism value.

2.2 THE ENVIRONMENTAL ASSESSMENT

Based the proposal and dependent on the size, nature, locality and operation of the proposed irrigation project and expected significant environmental affects, the extent and detail of the required environmental assessment will be decided in consultation with the **DWA**.

The assessment itself involves broad consultation with all interested and affected parties, the assessment of available information, including, if necessary, the gathering of additional data, and the preparation of a report on the assessment. The report should include the consideration of alternatives, the identification and classification of the potential impacts, a review of these, details of possible mitigatory measures and a monitoring programme.

The guidelines which follow give an indication of how the assessment phase should be approached, the variety of impacts both positive and negative which need to be considered, the wide range of environmental considerations and finally possible mitigatory measures and their practicality.

2.2.1 Methodology

Methodology of the environmental assessment should include:

a) identification of and consultation with all interested and affected parties, local, national and in some cases international
b) identification and use of available data bases and pertinent literature
c) identification and use of sub-consultants for technical and social evaluations
d) interviews with knowledgeable persons
f) comparison with similar developments in Namibia and elsewhere
g) minimal basic research to answer major, outstanding questions.

2.2.2 Identification of potential positive and/ or negative impacts

Briefly describe positive and/or negative impacts that are expected to be caused by the extraction of water from the perennial rivers and the irrigation project itself consider separately for clearing, planting, cultivation and harvesting activities at the project site.

downstream effects including any at the river mouth, estuary or delta region should also be investigated. Take into account:

a) ecological effects of the irrigation scheme
b) social effects of the irrigation scheme
c) effects on the hydrology and water quality of the river downstream
d) impacts on groundwater dynamics
e) impacts of altering river flow regimes on the ecology of the floodplain, river mouth,
estuary or delta
f) economic activites and landuse in the floodplain and downstream
g) impact of altering water supply on urban, industrial, and rural users downstream
h) potential for increased incidence of water-borne and water related diseases
i) impact of altered flow regimes and the irrigation project on terrestrial and aquatic wildlife in the area and downstream
j) effect of existing and predicted landuse in the catchment area, at the irrigation scheme and downstream
k) effect on historic, archaelogical, cultural, aesthetic and scientific elements of the region
l) potential for establishment of alien and/or invasive plants or animal pests
m) effect on tourism revenues
n) effect of evaporation losses
o) potential for soil compaction and salinification
p) water provision for local population
q) potential for water polution by fertilizers, pesticides and diesel
r) impact on local populations using natural resources of area
s) impact on riverbank stability
t) impact of silt loads in runoff from the irrigation project and downstream
u) impact of clearing activities, particularly on river margins
v) impact on riverine forest and communities.
w) impact on fisheries.

2.2.3 Checklist

In addition to the specific environmental considerations listed above, the environmental assessment should note if the proposed irrigation project, or its associated infrastructure would affect Negatively or Positively, or be Constrained by the following factors at the site of the irrigation development or downstream, during planning, implimentation or operation.

a) Water

- natural drainage patterns and runoff
- temporary water flow, i.e. frequency and magnitude, timing and duration
- permanent water flow, frequency and magnitude
- sheet flooding, heavy rainfall, runoff patterns
- seasonal water availability
- drought
- conservation value of surface waters
- recreation and tourist value of surface waters
- groundwater recharge
- quality of surface- or groundwater, for humans and ecological processes
- quantity of surface- or groundwater
- increased pollution, by fertilizers, pesticides and diesel
- increased salinity
- changes in siltation rates and erosion
- wasteful use of water
- functioning of the river mouth, estuary or delta region
- nutrient cycling.

b) Soil/Land

- landuse patterns
- water and wind erosion
- siltation and replenishment of alluvial silts
- contamination by oils or toxic chemicals (including pesticides)
- seed banks
- soil nutrients and impact of fertilizers
- salinification
- soil compaction
- soil moisture
- service roads
- land clearing, particulary near riverbanks
- opening and closing of river mouths or estuaries

c) Socio-Economic considerations

- cultural and traditional constraints
- age and gender issues
- composition of households and communities
- degree and type of community organisation
- authority structures

- growth rate of local populations
- adequacy of local services
- settlement patterns
- displacement and relocation of people and livestock
- land and resource tenure considerations
- traditional landuse patterns
- dependence and utilization of natural resources
- privatisation
- employment situation and income distribution
- public health, safety and social services
- altered access to schools, clinics, and other services

d) Plants and Animals

- biodiversity
- rare and endangered species and habitats
- spread or introduction of invasive species
- bush encroachment
- clearing and habitat destruction
- harvesting of natural resources and over-exploitation
- deforestation and recruitment, particularly of riverine forest
- natural migration
- nutrient flow
- species composition and diversity
- change in habitat structure
- disease vectors
- impact of pesticides and fertilizers
- wild animal vs. crop conflict.

e) National interests

- future development options
- water developments
- industry, mining, agriculture, ecotourism, infrastructure
- archaeological and palaeontological sites
- historical and cultural monuments
- sites of special scientific interest
- landscape features and aesthetic qualities of landscape
- tourist potential
- recreation potential
- cross-border interactions
- public participation, local, national and international

- impact on population demongraphics
- impact on food security
- impact on subsistance economy and life-style
- impact on sustainable utilization of natural resources.

vi) International interests

- water rights
- wildlife sancturies e.g. Ramsar sites
- water quality downstream.

2.2.4 Assessment of the identified environmental impacts

Briefly describe any potential environmental impacts of the proposed project, identified in Section 2.2.2, in terms of the following (differentiate between known and hypothesised):

a) short term and long term impacts
b) direct and indirect impacts
c) cummulative impacts.
d) trans-boundary and trans-national impacts (legal impacts, international agreements, public opinion)
e) reversible and irreversible impacts
f) costs of mitigation versus costs of no mitigation
g) benefits and costs: economic, social, ecological and interrelationships of these.

2.2.5 Possible Mitigation

Taking into consideration all points evaluated in sections 2.2.2, 2.2.3 and 2.2.5, describe possible mitigatory measures to reduce negative effects and enhance positive effects including:

a) technological alternatives
b) local participation in planning and management
c) institutional changes for management
e) appropriate technology
f) restoration or rehabilitation of sites
g) conservation of riverine belt area.

2.3 THE DECISION

The Department of Water Affairs will take into consideration the findings of the environmental assessment in the decision to grant or refuse a permit for water abstraction. Permission to proceed may be subject to certain conditions to ensure that the permitted water abstraction and the irrigation project as a whole is implemented and operated in a way which will minimize any detrimental effects and maximise the environmental benefits.

2.4 THE IMPLEMENTATION

It is the responsibility of the permit holder to implement the recommendations of the Department of Water Affairs based on the results ofthe environmental assessment and to implement the proposed monitoring programme. The Department reserves the right to do site inspections from time to time to ensure that the permit conditions are complied with.

2.4.1 Monitoring

A monitoring programme should be included in the final environmental assessment report and should take into consideration all points evaluated in section 2.2.2, 2.2.3 and 2.2.4. The monitoring programme should propose appropriate parameters to be monitored for long-term management including:

a) rainfall and evaporation
b) hydrology of rivers downstream
c) groundwater
d) vegetation changes: downstream, including at the river mouth, estuary or delta and around the extraction point
e) effects of shifts of human populations
f) wildlife and wildlands: migration and dispersal patterns, habitat requirements
g) erosion
h) effects on water table and floodplain vegetation
i) disease vectors, weeds
j) changes in economic and social status of affected population and changes in landuse

l) influence of future regional development on project: e.g. lifespan of project, factors likely to affect lifespan, will project cause shifts in landuse that will affect project success/lifespan/sustainability?
m) impact on water use efficiency
n) long-term sustainability

2.4.2 Environmental auditing (Follow-up evaluation)

Effective implementation, management and monitoring of mitigatory measures and environmental consequences of the irrigation project will be an importantant consideration in the renewal of water abstraction permits. All applications for permit renewal should include a report on the ongoing environmental situation based on the results of the monitoring programme. This monitoring report could form the basis of the environmental re-evaluation of the project and make it unnecessary to repeat a full environmental assessment.

3. WATER ABSTRACTION PERMIT PROCEDURE

Applications for permits to abstract water for irrigation purposed must be submitted to:

The Deputy Permanent Secretary
Department of Water Affairs
Private Bag 13193
WINDHOEK

The application will be directed to the Deputy-Director: Law Administration, Training and Media Liaison for processing. He will then determine if the proposed irrigation project qualifies as a large irrigation project, meaning a project which will irrigate more than 9 ha or use more than 100 000 m^3 of water per annum. If the proposed project qualifies as a large irrigation project, then he will advise the permit applicant that the

irrigation project requires an environmental assessment before a water abstraction permit can be considered and will make available these Guidelines to the applicant. The applicant will also be informed that the Chief: Research will assist with determining the extent and scope of the environmental assessment required.

The Chief: Research will be advised of the application and the assistance needed. He will discuss the proposed project with the applicant, if necessary undertake a site visit, review the formal project proposal and will advise on the planning of the environmental assessment. The environmental assessment itself is the responsibility of the applicant or his consultant. The final report on the environmental assessment will be evaluated by the Research Division who may solicit comment from the Department of Agriculture and Rural Development or the Directorate of Environmental Affairs at the Ministry of Wildlife, Conservation and Tourism or any other Ministry as deemed necessary. The final report and comment will form part of the documentation required by the Water Board. The final decision on the approval of a water abstraction permit will thus be based on economical, hydrological, geohydrological and environmental considerations. (Refer to ANNEXURE 1 for a schematic representation of the implementation procedure.)

The approval may be subject to certain conditions and a monitoring programme which the applicant must carry out. The Department of Water Affairs retains the right to do site inspections if necessary and permit renewals will depend on stipulated conditions being met and the results of the environmental monitoring programme.

4. CONCLUSION

In keeping with the Namibian Constitution and increasing environmental awareness worldwide, the Ministry of Agriculture, Water and Rural Development wishes to encourage the sustainable utilization of natural resources, particularly water, and seeks to promote environmentally sound development. To facilitate the development of environmentally sound irrigation projects, the Department of Water Affairs has

compiled these guidelines for environmental assessments of large irrigation projects, particularly those requiring permits for water abstraction.

These guidelines are designed to explain how the permit seeker should go about doing an environmental assessment and although the list of items to consider may be exhaustive, the extent of each assessment required will be decided after consultation with the Department of Water Affairs. The results of the assessment can then be used to evaluate the environmental implications of the proposed irrigation project and will be taken into consideration in the evaluation of the application for a permit to abstract water for the irrigation project.

PERMANENT SECRETARY FOR WATER AFFAIRS

SEPTEMBER 1993

4. ACKNOWLEDGEMENTS

These guidelines were compiled by the Research Division and are based in part on the draft terms of reference for environmental assessments for the Central Area Water Master Plan, Phase 1, Volume 9, Environmental Aspects, July 1993.

IMPLEMENTATION PROCEDURE

FOR LARGE IRRIGATION PROJECTS REQUIRING AN ENVIRONMENTAL ASSESSMENT AS PART OF AN APPLICATION FOR A WATER ABSTRACTION PERMIT

Applicant approaches the Department of Water Affairs (DWA) for a water abstraction permit.

↓

DWA informs the applicant that an Environmental Assessment (EA) is required and offers assistance by providing the document on "Guidelines for Environmental Assessments of Large Irrigation Projects".

↓

The applicant is referred to the Chief: Research who reviews the irrigation proposal and in consultation with the applicant, determines the extent and detail of the EA needed and agrees on the terms of reference (TOR) of the EA.

↓

Applicant conducts EA according to Guidelines and the agreed TOR.

↓

Applicant submits a formal report on the EA of the irrigation project.

↓

Water Board, advised by the Hydrology, Geohydrology, Research and Planning Divisons in the DWA, either grants or refuses the permit and states all conditions.

↓

Applicant implements the irrigation project.

↓

Site inspections from time to time by DWA to ensure that the permit conditions are complied with.

↓

DWA requests the results of the environmental monitoring programme (= Environmental Audit) for the evaluation when the renewal of the permit becomes due.

ANNEXURE 1

APPENDIX D

Occurrence of Amphibians, Reptiles, and Mammals in National (MET) Protected Areas *(Draft Tables)*

Occurrence of Amphibians, Reptiles and Mammals in the Hardap National Protected Area

(List compiled by M Griffin, Biodiversity Inventory, Ministry of Environment and Tourism, P/B 13306, Windhoek, Namibia)

PLEASE NOTE: These rankings should not be quoted or published before checking with the author.

In view of the fact that biodiversity data is unavailable for the Stampriet Artesian Basin as such, the data for Hardap was included as it borders on the study area. It does, however, not cover the Kalahari dune area.

The definitions used in the tables are as follows:

Present: Population may be viable

Marginal: Marginal occurrence, viability unknown

Expected: Presence not yet confirmed. Taxa not yet recorded, but because of known habitat/distribution and environmental factors, can reasonably be expected to occur. No conservation-status ranking is implied in this definition. However, most taxa would probably be initially classified as "peripheral" or "rare".

May occur: Implies extreme rarity/marginality

Extinct: Reasonable evidence exists that the taxa is no longer locally extant. Reintroduction from outside Namibia do not negate this status.

Occurrence of Amphibians, Reptiles and Mammals in the Hardap National Protected Area

Class/Order/Family	Common name	Status
CLASS AMPHIBIA	**AMPHIBIANS**	
ORDER ANURA	FROGS AND TOADS	
Pipidae	Platannas	
Xenopus laevis	Common Platanna	Present
Bufonidae	Toads	
Bufondus poweri	Mottled toad	Present
Bufondus hoeschi	Damara dwarf toad	Expected
Microhylidae	Fossorial frogs	
Breviceps adspersus	Bushveld rain frog	Expected
Phrynomantis annectens	Marbled rubber frog	Present
Ranidae	Pyxies, bullfrogs, stream frogs, cacos, puddle frogs etc.	
Pyxicephalus adspersus	Giant bullfrog	Present
Tomopterna cryptotis	Tremolo pyxie	Present
T. tandyi		Expected
Rana fuscigula	Cape river frog	Present
Phrynobatrachus mababiensis	Mababe puddle frog	May occur
Cacosternum boettgeri	Common caco	Expected
Hyperoliidae	Tree frogs, reed frogs & kassinas	
Kassina senegalensis	Bubbling kassina	Expected

CLASS REPTILES

Pelomedusidae	Side-necked and hinged terrapins	
Pelomedusa subrufa	Helmeted terrapin	Present
Testudinidae	Tortoises	
Geochelone pardalis	Leopard tortoise	Present
Psammobates oculiferus	Serrated tortoise	Expected
P. tentorius	Tent tortoise	May occur
Gekkonidae	Geckos	
Chondrodactylus angulifer	Giant ground gecko	Present
Ptenopus garrulus	Common barking gecko	Present
Lygodactylus bradfieldi	Namibian dwarf gecko	Expected
Narudasia festiva	Festive gecko	Expected
Pachydactylus capensis	Cape gecko	Present

Gekkonidae (cont.)		
P. turneri	Tropical button-scale gecko	Present
P. mariquensis	Marico gecko	Present
P. haackei	Namaqualand gecko	May occur
P. punctatus	Speckled gecko	Present
P. rugosus	Rough scaled gecko	Present
P. serval	Western spotted gecko	Present
P. weberi	Weber's gecko	May occur
Agamidae	Agamas	
Agama aculeata	Common ground agama	Present
A. anchietae	Western rock agama	Present
Chamaeleonidae	Chameleons	
Chamaeleo dilepsis	Flap-neck chameleon	Expected
C. namaquensis	Namaqua chameleon	May occur
Scincidae	Skinks and legless lizards	
Typhlosaurus lineatus	Striped blind legless skink	May occur
Lygosoma sundevalli	Common writhing skink	Expected
Mabuya acutilabris	Wedge-snouted skink	Expected
M. capensis	Cape skink	Expected
M. occidentalis	Western three-striped skink	Expected
M. spilogaster	Namibian tree skink	Expected
M. striata	Striped skink	Expected
M. sulcata	Koppie skink	Expected
M. variegata	Variegated skink	Expected
Lacertidae	Lacertids	
Meroles suborbitales	Spotted desert lizard	Expected
Ichnotropis squamulosa	Common rough-scaled lizard	Expected
Pedioplanis lineoocellata	Spotted sand lizard	Expected
P. namaquensis	Namaqua sand lizard	Expected
P. inornata	Namibian sand lizard	Expected
Heliobolis lugubris	Bushveld lizard	Expected
Nucras intertexta	Spotted Sandveld lizard	May occur
N. holubi	Holub's Sandveld lizard	Expected
N. tessellata	Striped Sandveld lizard	Expected
Cordylidae	Girdle-tailed lizards	
Cordylosaurus subtessellatus	Dwarf plated lizard	Present
Corylus jordani	Namibian girdled lizard	Expected

Varanidae	Leguaans	
Varanus albigularis	Veld leguaan	Present
V. niloticus	Water leguaan	May occur
Amphisbaenidae	Worm lizards	
Monopeltis infuscata	Dusky spade-snouted worm lizard	Expected
M. leonhardi	Kalahari spade-snouted worm lizard	Expected
Zygaspis quandrifrons	Kalahari round-headed worm lizard	Present
Leptotyphlopidae	Worm snakes	
Leptotyphlops occidentalis	Western worm snake	Expected
L. scutifrons	Peter's worm snake	Present
Typhlopidae	Blind snakes	
Rhinotyphlops lalandei	Delalande's blind snake	Expected
R. schinzi	Beaked blind snake	Expected
Colubridae	Typical snakes	
Lamprophis fuliginosus	Brown house snake	Present
Lycophidion capense	Cape wolf snake	Expected
Pseudaspis cana	Mole snake	Expected
Psammophylax tritaeniatus	Striped skaapsteker	Present
Dipsina multimaculata	Dwarf beaked snake	Expected
Psammophis leightoni	Forked-marked sand snake	Present
P. notosticus	Karoo sand snake	Present
P. trigrammus	Western sand snake	Expected
Prosymna bivittata	Twin-striped shovel snout	May occur
P. frontalis	South-western shovel snout	Expected
Philothamnus semivariegatus	Spotted bush snake	Expected
Telescopus beetzi	Namaqua tiger snake	Present
T. semiannulatus	Southern Africa tiger snake	Expected
Dasypeltis scabra	Rhombic egg eater	Expected
Atractaspididae	Centipede eaters, purple-glossed snakes, quill-snouts and stiletto snakes	
Xenocalamus bicolor	Variable quill-snouted snake	Expected
Atractaspis bibronii	Southern stiletto snake	Expected
Elapidae	Cobras and mambas	
Aspidelaps lubricus	Coral snake	Expected
A. scutatus	Shield-nose snake	Present
Naja nigricincta	Western spitting cobra	Present
N. nivea	Cape cobra	Present
Dendroaspis polylepis	Black mamba	Expected

Viperidae	Adders and vipers	
Bitis caudalis	Horned adder	Present
B. arietans	Puff adder	Present

CLASS MAMMALIA **MAMMALS**

Soricidae	Shrews	
Crocidura hirta	Lesser red musk shrew	Expected
C. cyanea	Reddish-grey musk shrew	Expected
Erinaceidae	Hedgehogs	
Atelerix frontalis	Southern African hedgehog	Expected
Pteropodidae	Fruit bats	
Eidolon helvum (seasonal migrant)	Straw-coloured fruit bat	Expected
Molossidae	Free-tailed bats	
Mormopterus petrophilus	Flat-headed free-tailed bat	Expected
Tadarida aegyptiaca	Egyptian free-tailed bat	Expected
Vespertilionidae	Vesper bats	
Miniopterus schreibersi	Schreiber's long-fingered bat	May occur
Myotis seabrai	Namibian gland-wing bat	Expected
Laephotis namibensis	Namib long-eared bat	May occur
Eptesicus capensis	Cape serotine bat	Expected
Schotophilus dinganl	Yellow house bat	Expected
Nycteridae	Slit-faced bats	
Nycteris thebaica	Common slit-faced bat	Expected
Rhinolophidae	Horseshoe bats and leaf-nosed bats	
Rhinolophus fumigatus	Rüppel's horseshoe bat	Expected
R. clivosus	Geoffroy's horseshoe bat	Expected
R. darlingi	Darling's horseshoe bat	Expected
R. denti	Dent's horseshoe bat	Expected
Hipposideros caffer	Sundeval's leaf-nosed bat	Expected
Cercopithecidae	Monkeys and baboons	
Papio ursinus	Chacma baboon	Present
Hyaenidae	Hyenas	
Proteles cristatus	Aardwolf	Present
Felidae	Cats	
Acinonyx jubatus	Cheetah	Marginal
Panthera pardus	Leopard	Marginal
P. leo	Lion	Extinct

Felidae (cont.)		Present
Caracal caracal	Caracal	
Felis sylvestris		Present
F. nigripes	Small-spotted cat	Expected
Canidae	Jackals, foxes, etc.	
Otocyon megalotis	Bat-eared fox	Present
Lycaon pictus	Wild dog	Extinct
Vulpes chama	Cape fox	Expected
Canis mesomelas	Black-backed jackal	Present
Mustelidae	Otters, weasels, etc.	
Mellivora capensis	Honey badger	Present
Ictonyx striatus	Striped polecat	Present
Viverridae	Civets & genets	
Civettictis civetta	Civet	May occur
Genetta maculata	Small-spotted genet	Present
Herpestidae	Mongooses	
Suricata suricatta	Suricate	May occur
Cynictis penicillata	Yellow mongoose	Present
Galarella sanguineus	Slender mongoose	Present
G. swalius	Brukkaros mongoose	Expected
Elephantidae	Elephants	
Loxodonta africana	African elephant	Extinct
Rhinocerotidae	Rhinoceroses	
Ceratotherium simum	White rhinoceros	Extinct
Diceros bicornis	Black rhinoceros	Extinct, reintroduced
Equidae	Zebras, horses, etc.	
Equus zebra	Mountain zebra	Extinct, reintroduced
Procaviidae	Dassies and hyraxes	
Procavia capensis	Rock dassie	Present
Orycteropidae	Aardvark	
Orycteropus afer	Aardvark	Present
Suidae	Pigs	
Potamochoerus africanus	Southern warthog	Present
Giraffidae	Okapi, giraffe	
Giraffa camelopardalis	giraffe	Extinct

Bovidae	Antelope, cattle, goats	
Connochaetes taurinus	Blue wildebeest	Extinct
Alcelaphus buselaphus	Red hartebeest	Extinct, reintroduced
Sylvicarpa grimmia	Common duiker	Present
Antidorcas marsupialis	Springbok	Present
Oreotragus oreotragus	Klipspringer	Expected
Raphicerus campestris	Steenbok	Present
Oryx gazella	Gemsbok	Present
Tragelaphus strepsiceros	Greater kudu	Present
Manidae	Pangolins	
Manis temminckii	Savanna pangolin	Present
Bathyergidae	Molerats	
Cryptomys damarensis	Damara molerat	Expected
Hystricidae	Porcupines	
Hystrix africaeaustralis	Southern African porcupine	Present
Pedetidae	Springhare	
Pedetes capensis	Springhare	Present
Myoxidae	Dormice	
Graphiurus platyops	Flat-headed dormouse	Expected
G. murinus	Woodland dormouse	Expected
G. rupicola	Namibian rock dormouse	Expected
Sciuridae	Squirrels	
Xerus inaurus	Cape ground squirrel	Present
Petromuridae	Dassie rat	
Petromus typicus	Dassie rat	Expected
Muridae	Rats, mice, gerbils, etc.	
Parotomys littledalei	Solitary whistling rat	Expected
Rhabdomys pumilio	Striped mouse	Expected
Mus indutus	Kalahari pygmy mouse	Expected
Mastomys natalensis	Natal multimammate mouse	May occur
M. Coucha	Multimammate mouse	May occur
Thallomys paedulcus	Tree rat	Expected
T. nigricauda	Black-tailed tree rat	Expected
Aethomys namaquensis	Namaqua rock rat	Present
A. Chrysophilus	Red veld rat	Expected
Desmodillus auricularis	Short-tailed gerbil	Expected

Muridae (cont.)		
Gerbillurus paeba	Pygmy gerbil	Present
G. vallinus	Namaqua brush-tailed gerbil	Expected
Tatera leucogaster	Bushveld gerbil	Present
T. brantsii	Highveld gerbil	Expected
Saccostomus campestris	Pouched mouse	Expected
Malacothrix typica	Large-eared mouse	Expected
Petromyscus monticularis	Berseba rock mouse	May occur
P. collinus	Namiblan rock mouse	Expected
P. bruchus	Brukkaros rock mouse	Expected
Leporidae	Rabbits and hares	
Lepus capensis	Cape hare	Expected
L. Saxatilis	Scrub hare	Expected
Pronolagus rupestris	Smith's red rock rabbit	May occur
P. randensis	Jameson's red rock rabbit	Expected
Macroscelididae	Elephant shrews	
Macroscelides proboscideus	Round-eared elephant shrew	Expected
Elephantulus rupestris	Rock elephant shrew	Expected
E. intufi	Bushveld elephant shrew	Expected

APPENDIX E

Application for Waste Water Discharge Permit

Similar forms are in use for Oxidation Ponds, Biofilters, Septic Tanks and French Drains

DEPARTMENT OF WATER AFFAIRS

FAX: (061) 232581
PRIVATE BAG 13193
TEL: (061) 2969111
WINDHOEK
REFERENCE NO:
NAMIBIA

WA.1(a) (Oxidation Ponds)

APPLICATION FOR A WASTE WATER DISCHARGE PERMIT, IN TERMS OF SECTIONS 21(5) AND 22(2) FOR EXEMPTION FROM COMPLIANCE WITH THE PROVISIONS OF SECTIONS 21(1) AND 21(2) OF THE WATER ACT, 1956 (ACT NO 54 OF 1956).

A. GENERAL INSTRUCTIONS

1. All applications for exemption, in terms of Section 21(5) and 22(2), from compliance with the requirements of Section 21(1) and 21(2) of the Water Act, 1956 (Act No 54 of 1956), together with all documents and plans must be submitted in triplicate to: The Under Secretary, Department of Water Affairs, Private Bag 13193, WINDHOEK.

2. To avoid unnecessary delays, please answer all the questions clearly to the fullest possible detail

B. GENERAL INFORMATION

1. Name of applicant .....

2. Postal address of applicant .....

.....

.....

3. Region in which place is situated .....

4. Type of establishment (village, school, town, other) .....

5. Source of water supply (borehole, river, well, spring, other)

.....

6. Total water consumption per day (m^3/ d)

.....

7. What is the total population served by the system ?

.....

C. TECHNICAL DETAILS

1. SITE OF SEWAGE DISPOSAL SCHEME

1.1 Submit a site plan indicating the exact location of the sewage disposal works, irrigation area (if any) and point of discharge of final effluent in relation to the watercourses that drain the area.

1.2 Submit a detailed lay out plan of the sewage disposal works with all dimensions and capacities, including flows.

1.3 What is the distance of the sewage disposal works from the nearest settlement and source of water supply (e.g. borehole)?

.....

2. POND SYSTEM

2.1 Give a description of the method of pond operation:

2.1.1 Number of ponds in operation at any one time.

.....

2.1.2 Are there facilities for recirculation?

.....

2.1.3 Frequency of cleaning ponds.

.....

2.1.4 Frequency of inspections.

.....

2.1.5 How is the inflow measured?

.....

.....

2.1.6 Frequency of flow measurements.

.....

2.1.7 Frequency of clearing unwanted growth

.....

2.1.8 Disposal method of screenings

.....

.....

2.1.9 Disposal method of sludge when ponds are cleaned.

.....

.....

2.1.10 Are the ponds lined?

.....

2.1.11 If yes, what material is used for lining.

.....

2.2 Is there any increase of the sewage treatment system envisaged?

.....

2.2.1 If yes, by how much:

a. Flow (m^3/ d) .....

b. Population served .....

2.3 Indicate the following data:

a. Actual flow (m^3/ d) .....

b. Design flow (m^3/ d) .....

c. Average rainfall per year (mm/y) .....

d. Evaporation rate per year (mm/y) .....

2.4 Is there any disposal of industrial effluent into the system?

.....

2.4.1 If yes, name the type of industries and the volume of industrial effluent produced?

.....

.....

.....

2.4.2 Give the composition of such effluent.

.....

.....

.....

2.5 State the most recent analysis of the raw sewage and the final effluent:

Date of sample collection:	**Date of analysis:**	
Laboratory:	**Source**	
	Raw Sewage	Final effluent
Parameter analyzed		
Biological Oxygen Demand (BOD) mg O/ℓ		
Phosphates mg P/ℓ or PO_4 mg/ℓ		
Oxygen Absorbed mg O/ℓ		
Nitrates mg N/ℓ or NO_3 mg/ℓ		
Chemical Oxygen Demand (COD) mg O/ℓ		
Kjeldahl Nitrates mg N/ℓ		
Ammonia mg NH_3/ℓ		
Sodium mg Na/ℓ		
Conductivity mS/m @ 25°C		
Temperature °C		
pH		
Faecal coliforms number/100 ml		

3. DISPOSAL OF EFFLUENT AT OXIDATION PONDS

3.1. What is the final effluent used for : Irrigation, Evaporation, Disposal in a watercourse or other?

.....

3.2. If effluent is disposed in a watercourse answer the following questions:

3.2.1 What are the uses of watercourse downstream of the discharge point?

.....

.....

3.2.2. Past records of complaints by the community or objections by users downstream of the effluent discharge point.

.....

.....

3.2.3. What additional processes (filtration, disinfection and sterilization) will be applied to meet the requirements of the special standards in order to discharge into a watercourse?

.....

.....

3.3. If the final effluent is used for irrigation, answer the following questions:

3.3.1 What type of crops are irrigated and what are their water requirements?

.....

.....

3.3.2 What type of irrigation method is applied?

.....

3.3.3 What protective measures are there to prevent livestock from entering the irrigation area?

.....

.....

4. DECOMMISSIONING

4.1 Give details of decommissioning plan.

.....

.....

.....

.....

SIGNATURE DESIGNATION

....

DATE

.....

ANNEXURE

REQUIREMENTS FOR WASTE WATER TREATMENT AND DISCHARGE IN TERMS OF THE WATER ACT, 1956 (ACT NO.54 OF 1956)

The provisions of the Water Act, 1956 (Act No.54 of 1956) are intended, amongst other things to promote the maximum beneficial use of the country's water resources, and to safeguard public water supplies from avoidable pollution.

Provisions 21(1) and 21(2) of the Water Act concern the disposal of effluents derived from sewage purification systems. The attached questionnaire has been drawn up to assist applicants in dealing with the administrative procedures that arise out of the implications of these sections.

Section 21(1) of the Water Act states that the purification of waste water shall be an automatic consequence of using water and that purified effluent shall comply with the General Standard Quality Restrictions as laid out in Government Gazette R553 of 5 April 1962. Section 21(2) further stipulates that this purified effluent be returned as close as possible to the point of abstraction of the original water.

Any applicant who does not receive industrial wastes into its sewage system may apply, in terms of Section 22(2), for exemption from compliance with the provisions of Section 21. The Minister may grant such exemption, subject to conditions he/she may deem fit to impose. If exemption is granted, the applicant may plan for the establishment of industries which produce effluent, only within the framework of a clearly defined policy of non-acceptance of responsibility for the disposal of industrial effluents, or alternatively may accept industrial effluents if an amended application is made for exemption under terms of Section 21(5).

Any applicant that does receive industrial wastes into its sewage system, may apply, in terms of Section 21(5), for a permit exempting it from compliance with the provisions of Section 21(1) and 21(2). In this case the applicant assumes total responsibility for the purification and discharge of the industrial waste and the Minister may grant a permit, again subject to such conditions he/she may deem fit to impose.

In either case, the formulation of conditions under which exemption can be granted will involve careful consideration of a multiplicity of factors, many of which are determined by local circumstances. In order that these factors can be assessed, applicants are required to supply the data called for in the questionnaire.

APPENDIX F

Wastewater Disposal at Towns, Villages and Schools in the Stampriet Artesian Basin

TABLE F1: Wastewater Disposal at Towns, Villages and Schools in the Stampriet Artesian Basin

Town/Village/ School	Permit No	Date	System Type	Quantity m^3/d	Population	Water Source
Aminuis	315	1992	Oxid. Pond	160	1200	
Aranos	No permit	-	Septic tank	-	-	
Asab	No permit	-	Septic tank	-	-	
Gochas	375	1998	Oxid. Pond	-	630	
Hoachanas	No permit	-	-	-	-	
Kalkrand	357	1994	Oxid. Pond	30	1060	
Koes	257	1993	Oxid. Pond	80	-	
Leonardville	328	1992	Septic tank	30	800	
Mariental	288	1990	Oxid. Pond	1113	-	
Onderombapa	345	1993	Oxid. Pond	95	800	
Stampriet	374	1998	Oxid. Pond	72	500	
Witbooisvley	No permit	-	-	-	-	

This information was obtained from the permits kept by the Legal Section of the Department of Water Affairs, Windhoek, Namibia.

APPENDIX G

Listing of Hotels and Guest Houses in the Stampriet Artesian Basin

TABLE G1: Listing of Hotels in the Stampriet Artesian Basin (most of which are situated in towns)

Hotel	Address	Phone
La Ville Hotel (Closed)	Leonardville	0682 56 9118
Kalkrand Hotel	P O Box 75, Kalkrand	063 26 4098
Mariental Hotel	P O Box 619, Marietnal	063 24 2466
Sandberg Hotel	P O Box 12, Marietnal	063 24 2291
Gochas Hotel	P O Box 80, Gochas	06662-98
Aranos Hotel	P O Box 129, Aranos	06624-31
Asab Hotel	P O Box 7, Keetmanshoop	063 24 2577
Kalahari Hotel	P/bag 1042, Koes	06322-14

TABLE G2: Listing of Guest Houses in the Stampriet Artesian Basin

Guest House/farm	Address	Phone
Jagdfarm M'ela	P/bag 13175, Windhoek	06672-3122
Bitterwasser Lodge & Flying Club	P O Box 13003, Windhoek	06672-3820
Kuzikus Game Ranch	P/bag 13112, Windhoek	062-57 3100
Nababis	P O Box 80336, Windhoek	06638-1430
Intu Africa Lodge	P O Box 40047, Windhoek P O Box 785, Mariental	06324 8741
Anib Lodge	P O Box 800, Mariental	06324 0529
Auob Lodge	P O Box 17, Gochas	06662-39
Donkerhoek Gastefarm	P O Box 16, Mariental	06662-3113
Uri Desert Run	P O Box 83, Koes	06322-2021
Kalahari Game Lodge	P O Box 22, Koes	06662-3112
Kalahari Gemsbok Ranch	P O Box 22, Koes	0662 #3112

APPENDIX H

General Standards for Effluents and Sewage

General Standards for Effluents and Sewage

All industrial wastewater discharged into the environment must comply with certain standards to protect the environment, and especially groundwater sources from pollution.

The Water Act (Act 54 of 1956) stipulates in Section 21(1) that the purification of wastewater shall form an integral part of the use of water and that the quality of wastewater discharged shall comply with certain standards as laid down by Government. These standards are reflected in **TABLE H1**.

TABLE H1: General Standards for Wastewater Discharge into the Environment

Determinants	Maximum Allowable Levels
Arsenic	0,5 mg/l as As
Biological Oxygen Demand (BOD)	no value given
Boron	1,0 mg/l as B
Chemical Oxygen Demand (COD)	75 mg /l as O
Chlorine, residual	0,1 mg/l as Cl_2
Chromium, hexavalent	50 µg/l as Cr(VI)
Chromium, total	500 µg/l as Cr
Copper	1,0 mg/l as Cu
Cyanide	500 µg/l as CN
Oxygen, Dissolved (DO)	at least 75% saturation**
Detergents, Surfactants	0,5 mg/l as methylene blue active substances
Fats, Oil & Grease (FOG)	2,5 mg/l (gravimetric method)
Fluoride	1,0 mg/l as F
Free & Saline Ammonia	10 mg/l as N
Lead	1,0 mg/l as Pb
Oxygen, Absorbed (OA)	10 mg/l as O*
PH	5,5 – 9,5
Phenolic Compounds	100 µg/l as phenol
Phosphate	1,0 mg/l as P
Sodium	not more than 90 mg/l Na more than influent
Sulphide	1,0 mg/l as S
Temperature	35°C
Total Dissolved Solids (TDS)	not more than 500 mg/l more than influent
Total Suspended Solids (TSS)	25 mg/l
Typical faecal coli.	no typical coli should be counted per 100 ml
Zinc	5,0 mg/l as Zn

* Also known as *Permanganate Value* (or PV).

** In Windhoek the saturation level is at approx. 9 mg/l O_2. Saturation depends on atmospheric pressure.

The general standards for wastewater discharged into the environment are very strict, but in

accordance with Section 21 (5) of the Water Act provision is made that the Minister may exempt the producer of the wastewater from complying with the general standards on such conditions as may be specified by the Minister.