WATER QUALITY
MANAGEMENT SERIES

OPERATIONAL GUIDELINE NO. M1.0

RIVER DIVERSIONS

Operational guideline for control over the alteration in the course of a public stream

(SECTION 20 - WATER ACT)

Department of Water Affairs and Forestry

MARCH 1996

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OPERATIONAL GUIDELINES IN M-SUBSERIES

Operational guidelines dealing specifically with mining related issues form part of the M-subseries of the category Management Strategies and Instruments. To date only two documents have been published in the M-subseries, namely:

M1.0: Operational guidelines for Control over the Alteration in the Course of a Public Stream

M2.0: Guideline concerning Financial Provision for the Rehabilitation of Land Disturbed by Mining Activies

APPROVAL

Department of Water Affairs and Forestry, 1996. Operational Guideline for control over the alteration in the course of a public stream. Operational Guideline No. M1.0.

Operational Guideline M1.0 is approved for implementation by the Department of Water Affairs and Forestry.

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MARCH 1996

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DIRECTORATE: WATER QUALITY MANAGEMENT

OPERATIONAL GUIDELINE NO. M1.0

PREAMBLE

Operational guidelines are intended to assist the Department of Water Affairs and Forestry (DWAF) officials in the implementation of the Department's management strategy in a coherent and consistent manner. This is achieved by focusing an operational guideline at functional level.

Operational guidelines describe exactly the function to be carried out, how it should be done as well as the person responsible for its implementation. In some instances, specific technical guidance is also provided to assist officials in making judgemental evaluations.

An operational guideline may thus be defined as:-

A description of the principles, objectives and procedures for the implementation of a particular function of the Department.

This guideline is one in a series of operational guidelines for the implementation of core functions of the Department's strategy to manage water quality regarding prospecting and mining activities.

DEPARTMENT OF WATER AFFAIRS & FORESTRY
DIRECTORATE: WATER QUALITY MANAGEMENT

OPERATIONAL GUIDELINE NO. M1.0

1 INTRODUCTION

Various activities, mainly of a developmental nature, take place in South Africa's riverine environment. It is an integral part of the Department of Water Affairs and Forestry's (DWAF) regulatory system to manage the effect of these activities on the country's water resources. Such an activity is the alteration to the course of a stream. Potentially adverse effects of this activity on the water resource justify and require effective control which is stipulated by this operational guideline.

A stream alteration is any action which gives rise to an alteration in the course of a public stream which runs in a defined channel, whether or not such a channel is dry during any period of the year. Every effort should be made to avoid an alteration of a stream. An alteration has the potential to adversely affect the integrity of the water resource and/or the rights of water users. Justification on economic, social or environmental grounds for alteration has to be properly motivated before an application for an alteration will be considered.

For many years, control over the alteration in the course of a public stream was exercised through regulations in terms of Mines and Works Act, 1956 (Act 27 of 1956). Recognition of the potentially adverse effects of stream diversions on the water environment led to the inclusion of Section 20 in the Water Act in 1984 (by way of the Water Amendment Act 96 of 1984). The provisions of Section 20 provides insight into any contemplated action related to the alteration of a public stream.

A permit issued in terms of Section 20 is the key mechanism which facilitates effective control over an alteration. However, this mechanism does not provide for ongoing control **after** the proponent has met the obligation imposed in terms of this permit. Therefore, in instances where **ongoing control** is required, additional control mechanisms over and above a Section 20 permit will have to be employed.

DWAF's approach towards ensuring a healthy natural aquatic environment is being reviewed. This is likely to result in the natural aquatic environment being regarded as an integral part of the water resource itself, as well as one of the competing water users. This operational guideline embodies this view and attempts to provide some guidance on the evaluation of a stream alteration, taking the requirements of the natural aquatic environment into consideration.

This operational guideline does not include a technical content to assist officials to make evaluations of a technical nature. Best management practice guidelines pertaining to stream alterations will have to be used in conjunction with this operational guideline for this purpose.

2 PURPOSE AND FOCUS OF CONTROL

An alteration to a public stream can adversely affect the rights of water users and the health of the natural aquatic environment by influencing:-

- the **quality** of water required
- the **quantity** of water available
- **access** to the water
- **habitat** required for the natural aquatic environment.

In order to ensure that the effect on these aspects is acceptable, effective control must be exercised over all the activities relating to the alteration of a stream, i.e:-

- compliance with the provision of Section 20, particularly with respect to:-
  - application for a permit if an alteration is under consideration
  - communication with adjacent landowners
  - placement of advertisements in various news media to announce the proposed alteration

- identification and execution of impact assessments

- selection, design and implementation of impact management measures
- formulation, approval and issuing of a permit in terms of Section 20
- compliance with the obligations imposed in terms of the permit
- performance evaluation of implemented impact management measures
- securing financial provision.

Control in this regard mainly encompasses stipulating what must be done/achieved and the enforcing adherence to this. Section 20 provides the legal mechanism to achieve most of the control required, provided the provisions mentioned above are applied in a pro-active and sensible manner. However, the activities which can be controlled in terms of Section 20 only relate to the activities which take place from *application* for a permit up to *demonstration* that the permit conditions have been met. Additional control, over and above those exercised by Section 20 may be required as outlined in Section 6.

3 GUIDING PRINCIPLES AND FUNDAMENTAL PREMISES

The guiding principles constitute the value system which should apply throughout the process of control over a stream alteration, i.e. from application to alter a stream up to demonstration of fulfilment of the imposed obligations. These principles include:-

- **Transparency:** The full process and its deliverable must be open and available to stakeholders, within reason.

- **Consistency:** All issues should be addressed in a manner consistent with similar situations nation-wide, e.g. requirements concerning best management practices, setting compliance requirements, etc.

- **Accountability and responsibility:** All requirements stipulated must be tangible and measurable.

- **Polluter pays:** All costs associated with motivation of the permit application, demonstration of fulfilment of requirements, consultation with stakeholders, etc. shall be borne by the proponent.

- **Sustainability:** The altered stream becomes the new stream in all aspects and must therefore be self-sustaining in the long term. *Inter alia*, it must not require ongoing inputs such as pumping, high maintenance, etc.

Over and above the above-mentioned guiding principles the following *fundamental* premises apply to the alteration of a public stream:-

- The natural course of a stream should ideally not be altered, as alteration could adversely affect the integrity of the water resource and the rights of water users.

- Justification on economic, social or environmental grounds for alteration of a public stream is, however, acknowledged.

- The original stream remains in place until the alteration is *fully* completed.

- The need in some instances for the implementation of intermediate phases in the alteration, leading up to the provision of the final self-sustaining alteration in the long term is acknowledged. However, all applications for an alteration must address all phases and no temporary alteration on its own should be allowed.

4 DEFINITIONS AND QUALIFICATIONS

.1 Coordinated Regulatory System

It is generally accepted that effective resource management cannot be done in isolation. This fact is acknowledged by the Department and approaches towards coordination and integration are pursued where possible. This has led to coordinated regulatory systems. For the purpose of this document, a regulatory system is defined as:-

> *"A management strategy adopted and executed by a Department in order to fulfil its mandate."*

Such a system consists of statutory and non-statutory components. Typical examples, from the Department's perspective of coordinated regulatory systems are:-

- Sectoral-specific strategy concerning solid waste, where the Department acts as the lead agent (see Section 5) and administrates portions of the Environment Conservation Act on behalf of the Department of Environment Affairs and Tourism, with the objective of minimising the adverse effect of solid waste sites on the water environment.

- Sectoral-specific strategy for prospecting and mining, where the Department participates within an integrated environmental management system which is administered in terms of the Minerals Act, 1991 (Act 50 of 1991). This approach enables the Department, *inter alia*, to gain insight into and control mines that could adversely affect the water environment. This is not possible within the Department's regulatory system.

Control over the alteration in the course of a public stream is part of the Department's regulatory system. For practical reasons, and due to the fact that the majority of applications for alterations are from the mining industry, the information needed for processing an alteration application was included in the "Aide Memoire for the preparation of environmental management programme reports (EMPR) for prospecting and mining". Generally, an EMPR should be a

useful source of further information required for considering an alteration application. Therefore, there must be a strong link concerning information needs, between the integrated environmental management system for prospecting and mining (which forms part of the Department of Mineral and Energy Affairs' regulatory system) and the control over the alteration of a public stream (which forms part of the Department's regulatory system).

.2 Definition of a Public Stream

The Water Act, 1956 (Act 54 of 1956) defines a **public stream** as:-

> *"A natural stream of water which flows in a known and defined channel, whether or not such channel is dry during any period of the year and whether or not its conformation has been changed by artificial means, if the water therein is capable of common use for irrigation on two or more pieces of land riparian thereto which are the subject of separate original grants or on one such piece of land and also on Crown land which is riparian to such stream: Provided that a stream which fulfils the foregoing conditions in part only of its course shall be deemed to be a public stream as regards that part only."*

Further Departmental interpretation of the definition of a stream is based on the concept of a riverine environment which is defined as follows:-

> *"A riverine environment is defined as that area lying between the 1:50 year floodline around a water course or vlei or within an area bounded by 50 m on either side of the deepest section, whichever is the greater. The environment is deemed to include the zones below the area thus defined in which subsurface water flows."*

.3 Natural Aquatic Environment

The natural aquatic environment is an integrated system composed of:-

- stream/river bed
- water
- stream/river bank.

with chemical, biological and physical properties.

Components of the natural aquatic environment are illustrated in Figure 1. For each component, it may be theoretically possible to assess the physical, chemical and biological requirement to ensure a healthy natural aquatic environment.

The Department is moving towards managing the natural aquatic environment as a resource. Hence, the biota, the physical and chemical instream habitats and the processes which link biota and habitats, are all considered to be inseparably part of the water resource itself. In the past, the Department focused mainly on the water quality aspects of the water component only.

5 CONSULTATION

As the control over the alteration of a stream is fully within the Department's regulatory systems, it is obvious that the Department is the *lead agent* in this regard. A lead agent could be viewed as an authority which, whilst fulfilling its mandate, also serves the collective interests of other interested and affected parties to the satisfaction of the parties concerned. Up to now this consisted of placing media advertisements and sending letters to adjacent land owners. The advertisements and letters are intended to serve as the means of communication with the major stakeholders mainly. It is the proponent's responsibility to identify and involve all interested and affected parties. The Department must assume responsibility for identifying and involving any additional stakeholders who may have been overlooked, e.g.:-

- parties who have acquired riparian rights indirectly
- conservation authorities
- recreational bodies/organisations
- water boards/irrigation boards.

6 ADDITIONAL CONTROL

.1 Statutory Measures

In general, an alteration to the course of a stream does not adversely affect water quality. However, an alteration can aggravate other pollution or potential pollution sources, e.g. an alteration which diverts the stream over an undermined area or landfill site. It is imperative that the adverse impacts be effectively controlled in an ongoing manner. However, owing to the transitional

nature of the regulatory mechanism embodied in Section 20, no long-term obligation can be imposed on the proponent. Obligations imposed in terms of Section 20 must be such that the proponent can be relieved of these obligations after demonstration that they have been successfully met. Thus, the provision of Section 20 is *not* the mechanism to ensure the above-mentioned ongoing control in the long term. Other appropriate control mechanisms, e.g. Section 21, etc must be utilised. Therefore, in addition to complying with the provisions of Section 20, a proponent could be required to comply with other provisions of the Water Act and other Acts simultaneously.

Figure 2 outlines the decision criteria relating to a stream alteration influenced by other pollution sources in order to assist officials in the selection of the appropriate control mechanism(s).

.2 Financial Provision

Financial provision to reduce the environmental risk associated with alteration of a stream is currently not a statutory requirement in terms of the Water Act except in cases where it is considered to be part of an EMPR and thus covered by the regulatory system in terms of the **Minerals Act**. Other cases that are not included in the latter are addressed on a very *ad hoc* basis.

The proponent should make financial provision for the eventuality of his becoming insolvent or abandoning the operation. The Department will be able to undertake maintenance and/or mitigation measures to ensure the long-term self-sustainability of the alteration using the finance provided. Uncertainties such as the following could be motivation for requiring financial provision:-

- The long-term sustainability of the diversion cannot be guaranteed, by virtue of the design (e.g. use of pumps to transfer flow to the alteration).
- The long-term integrity of mitigation measures cannot be guaranteed, by virtue of their design (e.g. use of lining system to prevent seepage of underground mine water into the diversion).
- The credibility of the proponent is questionable, or the proponent cannot guarantee the completion of the alteration to the design specifications. Usually, this should not pose a major problem since the functioning of the original stream is not discontinued until the alteration is fully completed. However, costs could be incurred in the event of the alteration being

abandoned or not meeting specifications. This cost can mainly be attributed to the rehabilitation of the incomplete alteration.

In the few instances that DWAF requested financial provision, it was enforced by making it a prerequisite for approval of the Section 20 permit. In the absence of a formalised approach, the following methods of ensuring that adequate financial provision is made are currently favoured:-

- A guarantee of financial provision must be provided by a **credible** body such as a sound financial institution or even the corporate body of the organisation applying for the permit.

- A secured fund could be provided by the proponent specifically for the purpose.
- A combination of the above would also be acceptable. Initially a guarantee can be provided whilst the fund is accumulating to the required amount.

Owing to the specific nature of an application, each case should be considered on its own merit and the financial provisions tailored accordingly. The assistance of Legal Services must be employed in this regard.

7 LEGAL ASPECTS

The Minister may issue a permit for the alteration of a stream in terms of Section 20 (1) (a), or may exempt a person from any or all the provisions of subsections (1), (2) and (3) on such conditions as may be specified. This exemption in terms of Section 20 (10) (a) may be withdrawn at any time, or the conditions may be amended. (See Appendix 4).

At present, permits are required for all stream alterations, except in those cases exempted in paragraph 1 (b) of Section 20 which reads as follows:-

"Paragraph (a) shall not apply in a case where the course of a public stream is altered -

- *in accordance with an order of a water court under subsection (9);*
- *by or on the authority of an irrigation board under section 89 (1) (e);*
- *by a local authority within its area of jurisdiction;*

- *by the construction of soil conservation work in terms of the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983)."*

The legal standing of an exemption in terms of Section 20(10)(a) is similar to the permit. In certain instances an exemption may give permission to divert the stream, but in most cases it is a method of managing an activity within the riverine environment which does not necessitate a Section 20 permit. Exemptions should be carefully considered. Cases where exemptions could be contemplated are where:-

- the legal situation of the stream to be altered is in question, ie there is a strong possibility that the stream is private and therefore not subject to Section 20

- the proposed operation does not constitute an alteration of a stream in the true sense, eg an activity close to the 1:50 year floodline such as the provision of a bundwall

- in the course of natural horse shoe forming, the stream is redirected to its original course.

In cases where the issue of a Section 20 permit is not considered necessary, authorisation for exemption of a Section 20 permit has to be given by the Manager: Scientific Services.

.1 Application for a Permit

The proponent applying for the permit must be the person or organisation requiring the alteration of the public stream. The permit is issued to this person/organisation. The Department, i.e. the Minister, has no authority to issue a permit to any person/organisation other than the applicant. However, the Minister has the discretionary power to issue the permit or to withhold it.

The proponent requiring the alteration to the stream may appoint others to undertake any investigations, design and construction of the alteration on his behalf, but remains the responsible party. Furthermore, he has to prove that he has the legal authority to make an application for a permit if made on behalf of a group of persons or a legal entity.

.2 Obligations and Conditions

The obligations of a permit holder (proponent issued with a permit) are stipulated as permit conditions. Appendix 1 outlines a pro-forma permit which embodies generic permit conditions.

The most prominent obligations and conditions are:-

- Execution of activities and construction of works in accordance with specification in the approved technical report (see Appendix 2) which is a prerequisite for application of a permit in terms of a Section 20 application. Note that in the course of the evaluation of this permit application, the activities and designs in the technical report must be assessed by the Regional Director.

- Construction and implementation of the works in such a manner so as to ensure that rights of other persons are not violated during the execution and after completion of all activities.

- Appropriate rehabilitation of all disturbed areas and the original course of the stream.

- Appropriate management of adverse effects on water quality during the construction and after completion of the works.

- Appropriate management of adverse effects on catchment yield and hydrology during the construction and after completion of the works.

- Ensuring long-term stability of the works.

Conditions pertaining to the protection of the health of the natural aquatic environment have not been included.

.3 Enforcement of Permit Conditions

The enforcement of permit conditions entails:-

- ensuring that the permit holder carries out the prescribed activities in accordance with the specifications detailed in the technical report (see Appendix 2) regarding:-

  - construction of works
  - implementation and operation of monitoring system
  - analysis and interpretation of data

- the evaluation of results to ensure that performance criteria, as specified in the technical report, are met.

.4 Contravention of Section 20

Legal action may be instituted against:-

- any person or persons who contravene the general provisions of Section 20, e.g. the construction of an alteration before a permit has been issued.

- permit holders failing to comply with permit conditions.

The Minister has the discretionary power to amend or cancel any conditions or withdraw the permit in full upon sound grounds, e.g. failure to comply with the conditions of the permit. This also applies to an exemption issued in terms of Section 20 (10) (a).

The permit holder must be aware of the above and a condition to that effect must be included in the permit.

8 OPERATIONAL PROCEDURE

.1 Responsibilities for functions

The operational procedure states who should do what. In order to fulfil this requirement, responsibilities for the various functions embodied in the permit process are defined.

The responsibilities for the various functions that constitute control over the **alteration in the course of a public stream,** are fulfilled by:-

- The Regional Director
- Directorate Water Quality Management

- Manager: Scientific Services
- Directorate Administration
- Proponent/PermitHolder.

.1 Regional Director

The Regional Director assumes full responsibility for the execution of the function relating to an application and issue of a permit to alter a stream as outlined below. However, specialist assistance outside the Regional Office must be utilised when necessary. This applies in particular to the services that can be offered by the Directorate Water Quality Management and the Directorate Administration. The Regional Director is responsible for:-

- ensuring compliance with the administrative requirements prescribed by Section 20
- ensuring wider consultation than that prescribed by Section 20, when necessary
- evaluating and investigating objections received from riparian owners or the public. Legal Services should assist.
- ensuring that an appropriate impact assessment is conducted and that suitable impact management measures are designed. These must be properly documented in the technical report submitted by the proponent
- ensuring that additional control mechanisms (see Section 6) are applied, if required
- compiling a Record of Decision to endorse the technical evaluation and recommending approval to issue a permit.
- compiling a draft permit
- recommending the issue of a permit.
- ensuring compliance with permit conditions
- evaluation concerning relieving permit holders of imposed obligations after demonstration that these have been successfully met.

.2 Directorate Water Quality Management

The Directorate Water Quality Management is reponsible for:

- assisting the Manager: Scientific Services
- prividing technical and other assistance to the Regional Director (compulsory consultation)
- maintaining management instruments relating to alteration of a public stream

8.1.3 Manager: Scientific Services

The Manager: Scientific Services is responsible for:-

- sanctioning Records of Decision
- authorising the issue of permits
- authorising exemptions in terms of section 20 (10)(a).

8.1.4 Directorate Administrationn

The Permit Section is responsible for:-

- evaluating and rectifying legal shortcomings of the draft permit
- finalising the permit and issuing the permit to the proponent.

Legal Services is responsible for:-

- assisting the Regional Director with the evaluating and investigating of objections received from riparian owners or the public
- assisting with the determining of financial provision
- assisting with the wording of specific permit conditions

8.1.5 Proponent/Permit Holder

The proponent must carry out the following:-

- execute administrative requirements prescribed by Section 20
- compile the Technical Report
- provide additional information required
- execute permit conditions
- apply to be relieved of imposed obligations.

.2 Permit Process

The process of receiving and evaluating permit applications, formulating and issuing permits in terms of Section 20 is outlined below. The main aspects are illustrated in a flow diagram in Figure 6. This process flow is based on the Departmental procedure depicted in Figure 5. Note the compulsory consultation with Directorate Water Quality Management, where indicated.

The permit process is as follows:-

Step 1: The proponent approaches the Regional Director for assistance and advice on how to proceed with the application. The relevant guidelines, checklists, any additional requirements and standard advertisements are made available to the proponent. The composition of the professional team and their fields of expertise must be supplied to the Regional Director.

Step 2: The Regional Director issues a file reference number.

Step 3: The proponent presents a conceptual proposal to the Regional Director for consideration. The Regional Director conducts a preliminary evaluation of the proposal and forwards suggestions on proposed alterations. (Note that this is not a formal part of the process and that the Regional Director will not issue any formal approval of the proposal).

Step 4: The Regional Director evaluates the formal application and all the supporting information. He may choose to employ specialists in addition to the Directorate Water Quality Management to assist in evaluation of the technical aspects. Requests for additional information or clarity regarding some technical issues, may be made to the proponent. This should be minimal since Step 3 attempts to gain clarity on technical issues.

Step 5: After the Regional Director is satisfied with the merits of an application and has thoroughly addressed any objections raised by riparian rights owners or the public to the issuing of a permit, the Record of Decision is compiled.

Step 6: The Regional Director compiles a draft permit containing permit conditions and recommends that the permit be issued. Directorate Water Quality Management evaluates draft permit and refers to the Permit Section for finalising of the permit.

Step 7: Permit Section finalises the permit. The Regional Director and Directorate Water Quality Management evaluates the final permit.

Step 8: The Manager: Scientific Services authorises the issue of the permit and sanctions the Record of Decision. The Permit Section issues a permit to the proponent.

Step 9: The Regional Director monitors the proponent's performance in relation to the permit conditions. The Regional Director evaluates possible amendments to the permit.

Step 10: Once the Regional Director is satisfied that the permit holder has demonstrated that prescribed obligation criteria have been met, the permit holder is relieved of the obligations and responsibilities in terms of the permit.

9 EVALUATION

The evaluation encompassed in the control over the alteration of a stream is mainly aimed at making the decisions stated below. The decisions should be founded on the information provided in the Technical Report (see Appendix 2). All decisions preceding approval of a permit in terms of Section 20 should be compiled in a Record of Decision accompanying the draft permit. The decisions are:-

- overall key decisions in order to initiate compilation of a permit in terms of Section 20 and its eventual approval

- detailed decisions supporting the key decisions

- decision to relieve the proponent from imposed obligations after demonstrating that these have been successfully met.

Evaluation must also take into account the general criteria and knowledge gaps as stipulated in 9.3 and 9.4 respectively. The inter-relationship between the mining operation and the diverted stream can be conceptualised by referring to Figure 3.

Decisions/judgements concerning **exemption** in terms of Section 20 (10)(a) have to be based on sound information. The basic policy is **not** to grant any exemption, and to rather process a permit. In cases where exemptions are contemplated the same information needs as stipulated in this section will be required. Based on the information provided in the Technical Report, a decision can be made as from which subsection an exemption should be granted. The proponent should be informed accordingly upfront.

9.1 Key Decisions

The following are the key decisions to be taken in order to initiate compilation of a permit in terms of Section 20 and to recommend its approval.

- **Impact Assessment**

  Was identification and assessment of the impact of the proposed alteration on the water environment (e.g. surface water, ground water) appropriate, accurate and reliable?

- **Impact Management**

  Do proposed impact management measures fulfil the DWAF's current criteria and standards with respect to measures of this nature? After implementation of these measures, will the residual effect on the water environment also be acceptable?

- **Financial Provision**

If there is doubt as to the long-term self-sustainability of proposed impact management measures, is the financial provision adequate, accessible, secure and allocated specifically for the intended purpose?

- **Residual Risk**

  Is residual risk for adverse effects on the water environment acceptable? Have the above-mentioned aspects and the additional measures to minimise this risk been taken into consideration?

The above decisions must be made within the Department's hierarchy of water quality management goals.

9.2 Detailed Decisions

9.2.1 Impact Assessment

The identification and assessment of the impact of the proposed alteration must be appropriately accurate and reliable with regard to:-

a. Surface water

The effect on local water quality:-

- due to change in natural conditions, i.e. exposure of lower geological layer

- due to enhancement of pollution from sources such as seepage from dumps, underground workings, etc.

- due to decrease in run-off. This could also have an effect on a regional scale. Run-off dilutes other polluting sources. Therefore a reduction in run-off could result in a more pronounced pollution effect.

The effect on yield and hydrology:-

- due to recharge or seepage over the alteration. Does seepage occur to the groundwater or to lower lying plains from the alteration or vice versa?

- due to reduction in run-off. This applies particularly to the affected stream. In some cases run-off can be substantially reduced due to the diversion of flow to adjacent catchments.

b. Groundwater

The effect on:-

- local and regional water **quality**, due to enhancement of pollution from sources such as seepage from dumps, underground workings, etc.

- local and regional **yield and geohydrology,** due to recharge or seepage to groundwater or draining a groundwater source.

c. Health of the Natural Aquatic Environment

- Identification of existing aquatic life and any unique aquatic ecosystem

- Effect on aquatic life due to:-
  - change in water quality
  - change in habitat
  - provision of obstructions to movement of aquatic species
  - change in flow regime.

d. Riparian Rights

The effect on:-

- local and regional surface water quantity and quality

- local and regional yield and hydrology (effect on access to water source must also be considered)

- local and regional groundwater quantity and quality.

9.2.2 Impact Management

- Do the proposed impact management measures adhere to the current DWAF criteria for measures of this nature regarding:-

  - design
  - construction
  - operation
  - maintenance.

  These criteria are described in Figure 4.

- Taking cognisance of the impact management measures proposed, is this residual impact on the water resource acceptable with regard to:-

  - local and regional surface water quality and quantity
  - local and regional yield and hydrology
  - local and regional groundwater quality and quantity.

An example of the stipulations regarding objectives/requirements is described in Appendix 3.

9.2.3 Financial Provisions

Has the required financial provision been made to ensure that the proposed allocation is self-sustaining in the long term?

9.2.4 Residual Risk

The aspects outlined hereunder are aimed at quantifying the residual risk. It is not exhaustive and could be expanded depending on the specific case.

a. Proponent

- Did the proponent:-

  - Demonstrate that he understands the DWAF's requirements?
  - Translate these requirements into acceptable measurable objectives?

- Is the proponent's attitude and track record regarding environmental issues such that it could be stated with reasonable certainty that the alteration will be implemented and maintained as proposed?

b. Impact assessment

After taking due cognisance of Item 9.2.1, is the residual risk acceptable?

c. Impact management

After taking due cognisance of Item 9.2.2, is the residual risk acceptable?

d. Additional controls

Are additional controls in place to minimise the residual risk, (to ensure effective implementation and control over the alteration), these being:-

- Statutory instruments
  (These may include inter alia permits in terms of Sections 9, 9A, 9B, 9C, 12, 12A, 12B, 20 and 21 of the Water Act).

- Non-statutory instruments
  (These may include regional/catchment monitoring systems, etc)

9.3 General Criteria

Some general rules which are commonly accepted and could assist in the evaluation of a stream alteration application are given below. Some are a reiteration of what was stated previously, but are repeated for completeness:-

- Only complete and final schemes will be considered. Although intermediate or temporary steps may be involved, the applicant must submit the full scheme for consideration.

- Only passive schemes (not requiring ongoing operation or maintenance after completion) will be accepted. Whilst it may for example, be acceptable in the temporary condition to pump a stream across a water divide, it will not be accepted as the final solution.

- The new course of an altered stream should be over stable, undisturbed ground.

- Under special circumstances, where the DWAF is entirely satisfied that the alteration can be engineered to meet the stated objectives and where the applicant is prepared to make financial provision for long-term performance, reinstatement across disturbed ground may be considered.

- High extraction mining which results in surface subsidence or loss of groundwater will generally not be permitted under streams.

- Where an alteration is to be undertaken in stages or where the final scheme is only to be completed later, the applicant should be required to make financial provisions to ensure that the full scheme can be implemented even if the applicant's company is liquidated or cannot meet its obligations for any reason.

- The applicant should be required to assess the consequences of flood events exceeding the design recurrence interval. The Department will not accept a scheme which may, for example, be adequately designed for a 1:50 year recurrence interval, but which gives rise to excessive maintenance or repair costs for flood events exceeding this interval.

- Schemes which involve storage of water to attenuate floods or to manipulate water quality must be considered in the light of the impact on overall catchment yield. In those cases where schemes result in unacceptable reduction in catchment yield, the scheme may not be accepted.

9.4 Knowledge Gaps

It must be acknowledged that there are areas of uncertainty which must be addressed in many cases. The following are listed to draw the attention of the Department's officials to the cases which will require special consideration.

- The influence of total extraction mining on recharge and water quality within the riverine environment is poorly understood. Total extraction mining is a relatively new technique which is known to draw down

groundwater during the mining process. It is suspected that whilst the groundwater table will eventually recover, recharge could have been increased significantly and the potential for surface water pollution would thus increase.

- Stratification of water quality in opencast and underground mines may mitigate against impacts. This is, however, not yet proven.

- The behaviour of alterations across mine spoils or unconsolidated backfill is poorly understood. Investigations which have been undertaken to date indicate that spoils may settle by significant proportions as the water table rises. Groundwater recovers very slowly in rehabilitated open pit mines. The period of recovery may exceed 100 years and hence the stability of the alteration should be examined over this period. (See Figure 7).

- Prediction of acid mine drainage potential is a new science. New and improved techniques are, however, developing rapidly. The Department is justified in requiring that adequate investigations be undertaken in those cases where acid mine drainage may arise.

It must, however, be understood that whilst a conservative approach may be prudent in those cases where there is uncertainty, uncertainty itself should not be taken to be a good reason to reject an application to alter the course of a stream or river. The risk associated with the potential impacts are the proponent's responsibility and provided that it can be demonstrated that the proponent has the means and resources to adequately address the improbable consequences of his actions, no constraints should be placed on his progress.

In those instances where a risk is identified, the Department should choose between one or other of the following strategies:-

- at least one viable, albeit more costly, alternative should be implemented by the proponent should his proposal fail to meet the specified objectives.

- the proponent must make financial provision which will cover the cost of proven remediation should the his proposals fail to meet the specified objectives.

FIGURES

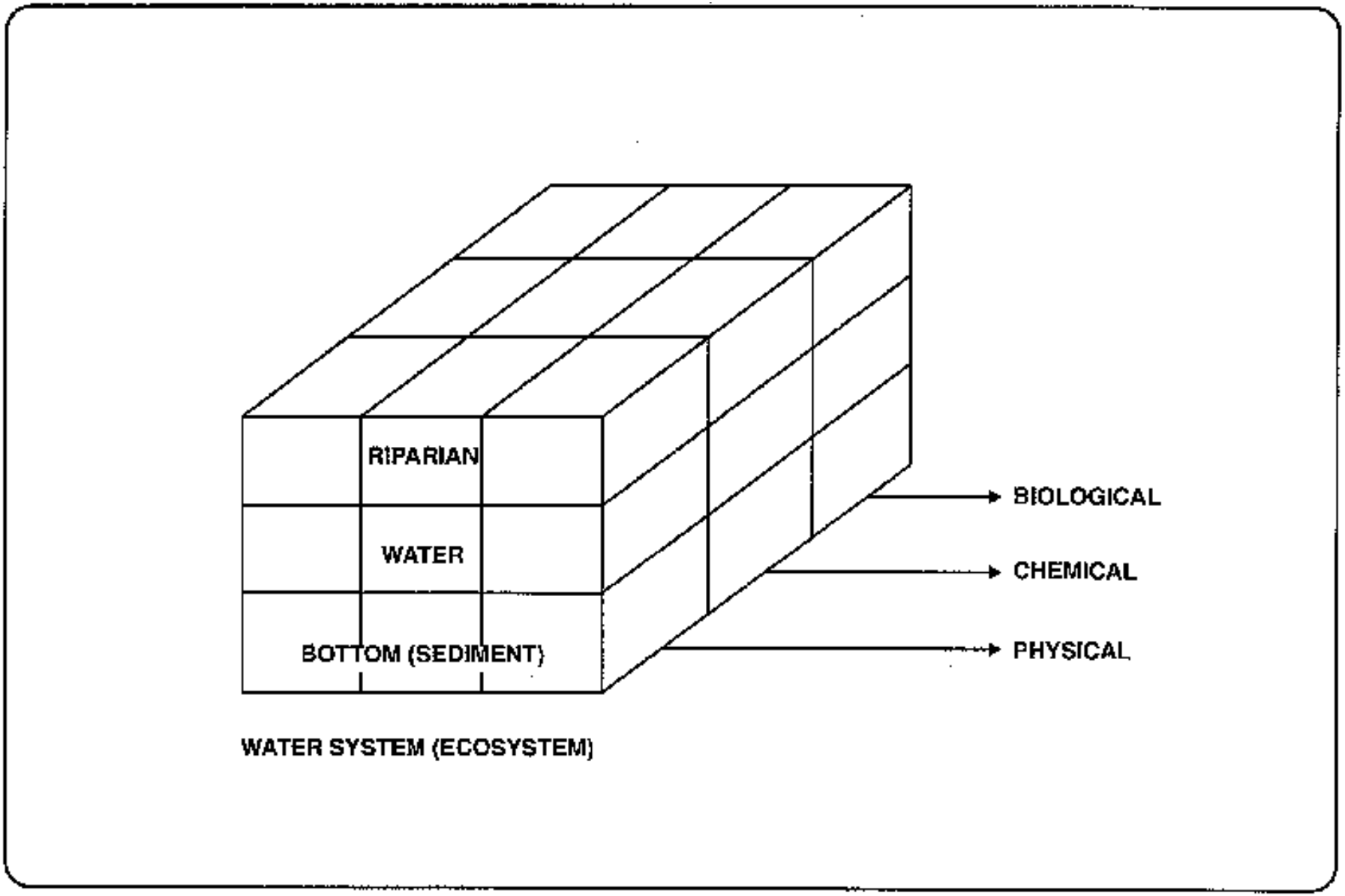


FIGURE 1 : COMPONENTS IN NATURAL AQUATIC ENVIRONMENT

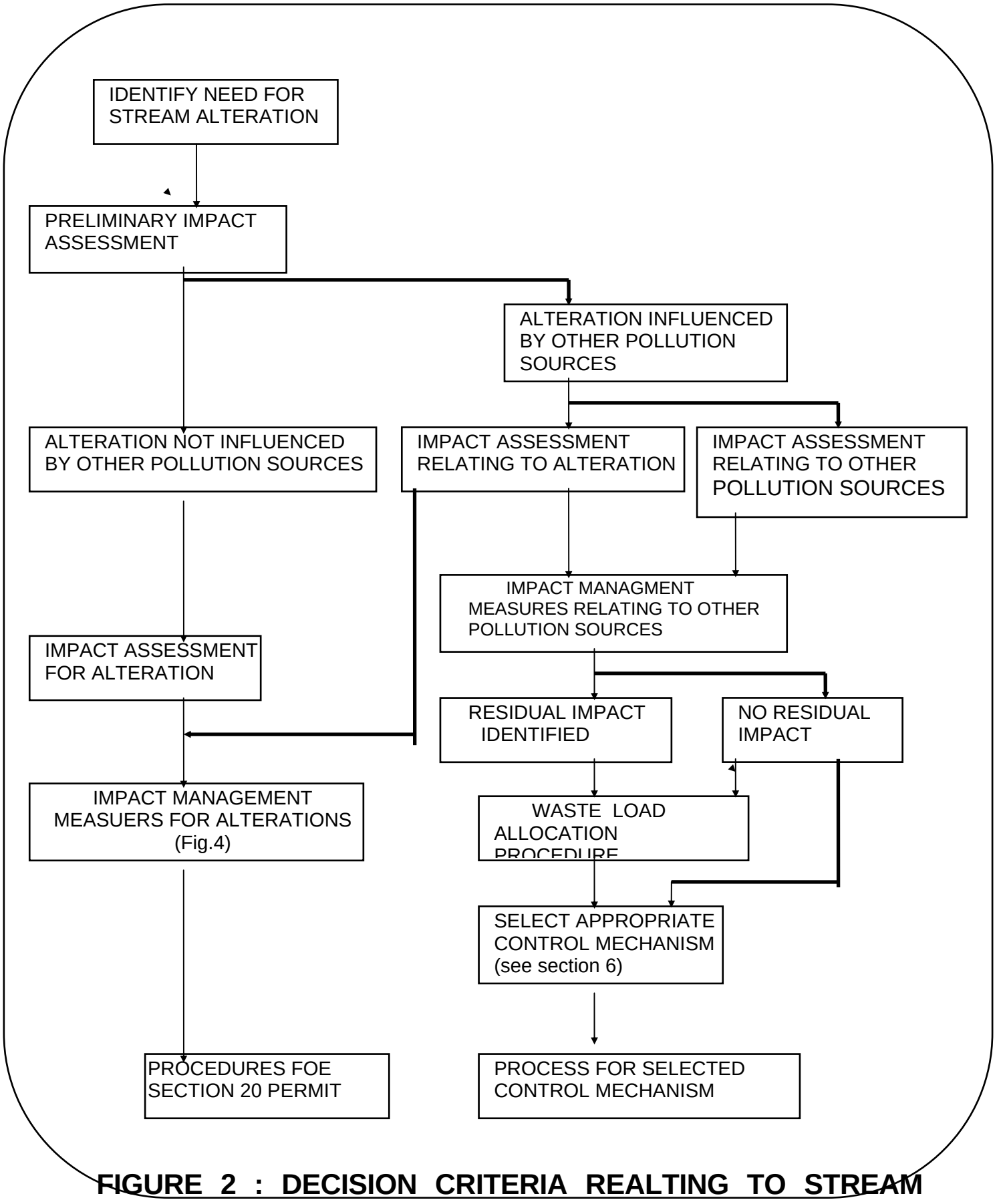
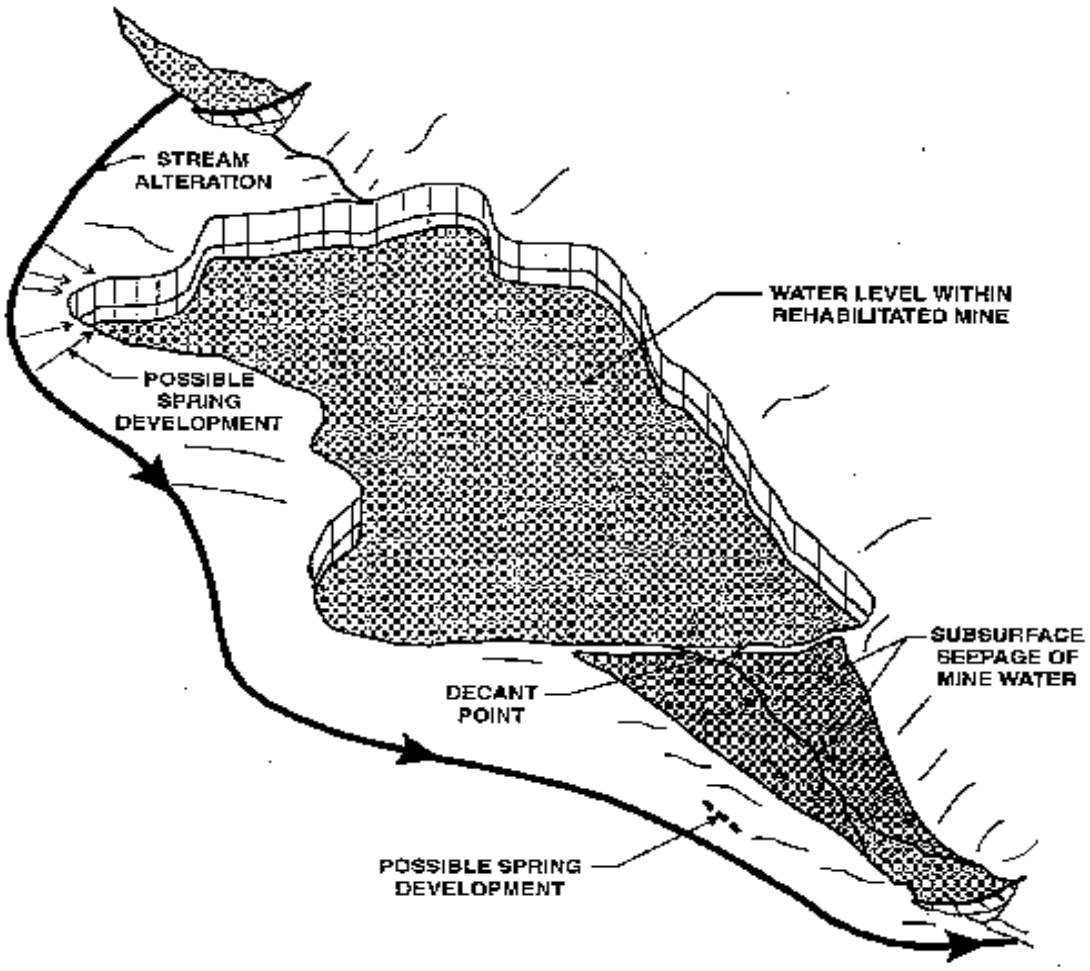


FIGURE 2 : DECISION CRITERIA REALTING TO STREAM ALTERATION INLUENCED BY OTHER POLLUTION SOURCES



~~FIGURE 3 : EXAMPLE OF INTER-RELATIONSHIP BETWEEN~~
MINING OPERATION AND STREAM ALTERATION

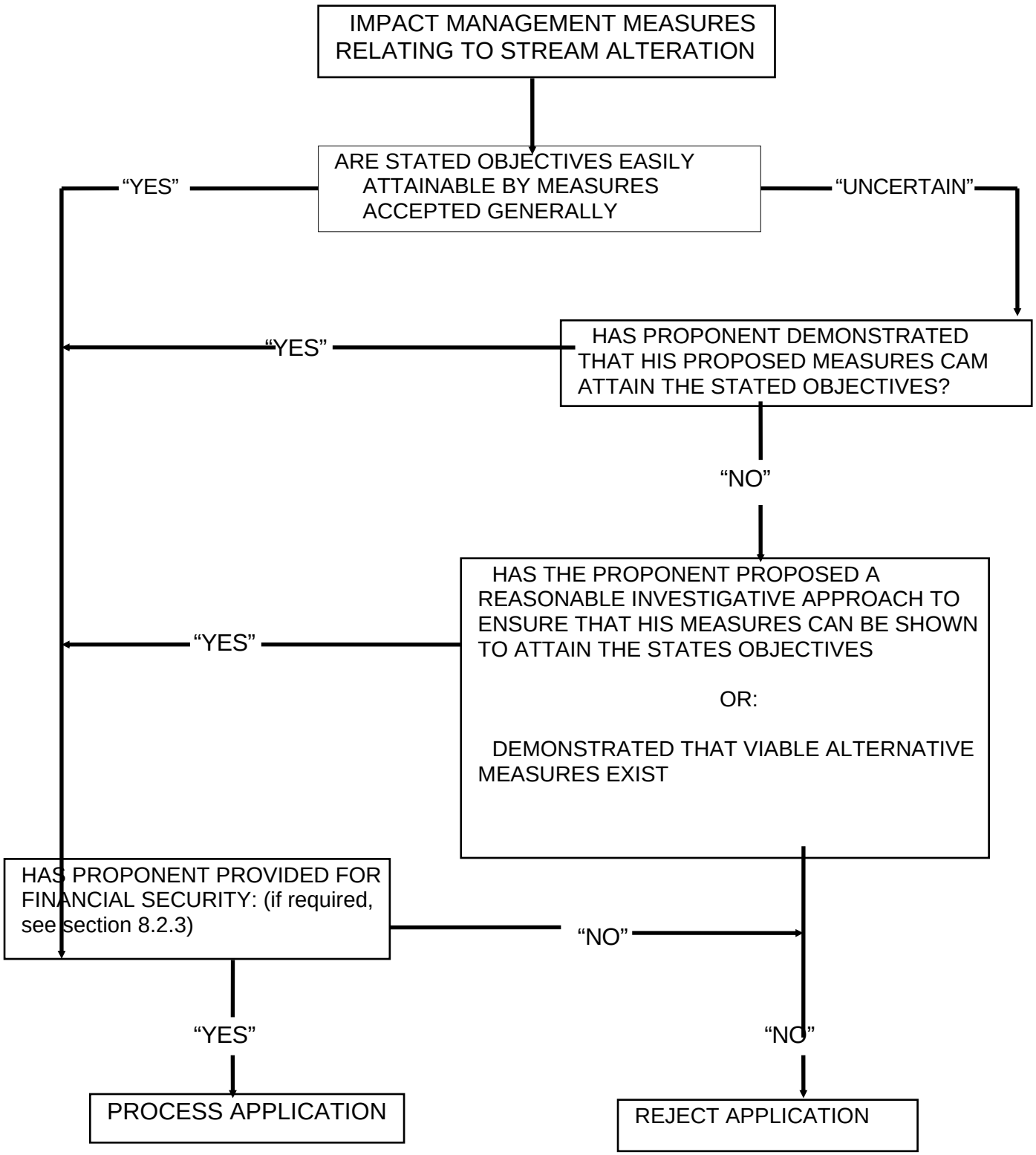


FIGURE 4 : DECISION CRITERIA RELATING TO IMPACT MANAGEMENT MEASURES

STEPS	ACTION	DWQM	REGIONS	PERMIT SECTION	MSS
1	APPLICANT APPROACHES DWA&F	❍	•		

2	ISSUE APPLICATION NUMBER		•		
3	CONCEPT PLAN EVALUATION	■	•		
4	DETAILED PLAN EVALUATION	■	•		
5	COMPILE ROD	■	•		
6	FORMULATE OF DRAFT PERMIT**	■	•		
7	DRAFTING OF PERMIT	■	•	■	
8	ISSUE PERMIT*	■	•		■
9	MONITOR AND AUDIT		•		
10	RELIEF OF OBLIGATION	■	•		

NOTES:

** STANDARD CONDITIONS OR SPECIAL CONDITIONS MAY BE IMPOSED

* MANAGER SCIENTIFIC SERVICES APPROVES PERMIT

LEGEND:

• LINE FUNCTION
■ CONSULTATION (COMPULSORY)
❍ OPTIONAL CONSULTATION

ABBREVIATIONS

DWA & F	DEPARTMENT OF WATER AFFAIRS AND FORESTRY
REGION	DWA & F (REGIONAL OFFICE)
DWQM	DIRECTORATE WATER QUALITY MANAGEMENT
MSS	MANAGER: SCIENTIFIC SERVICES
PERMIT SECTION	DIRECTORATE ADMINISTRATION

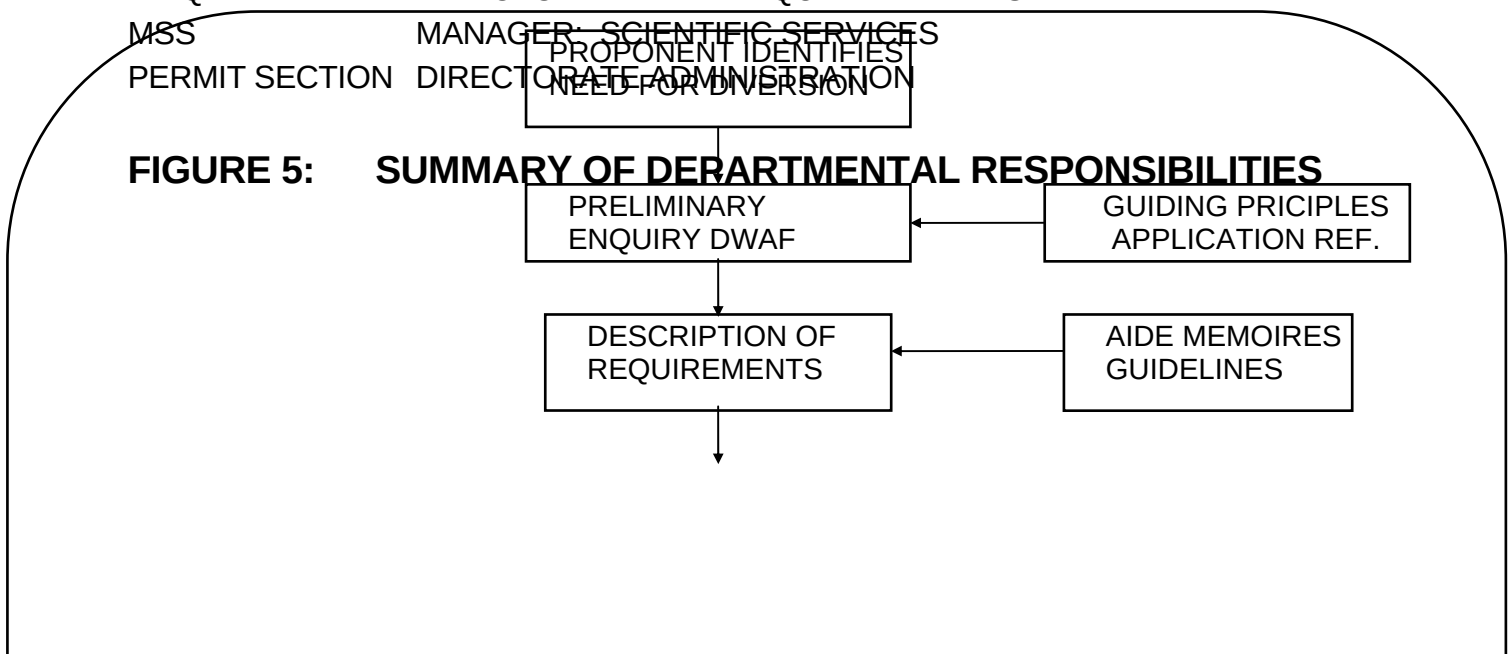


FIGURE 5: SUMMARY OF DEPARTMENTAL RESPONSIBILITIES

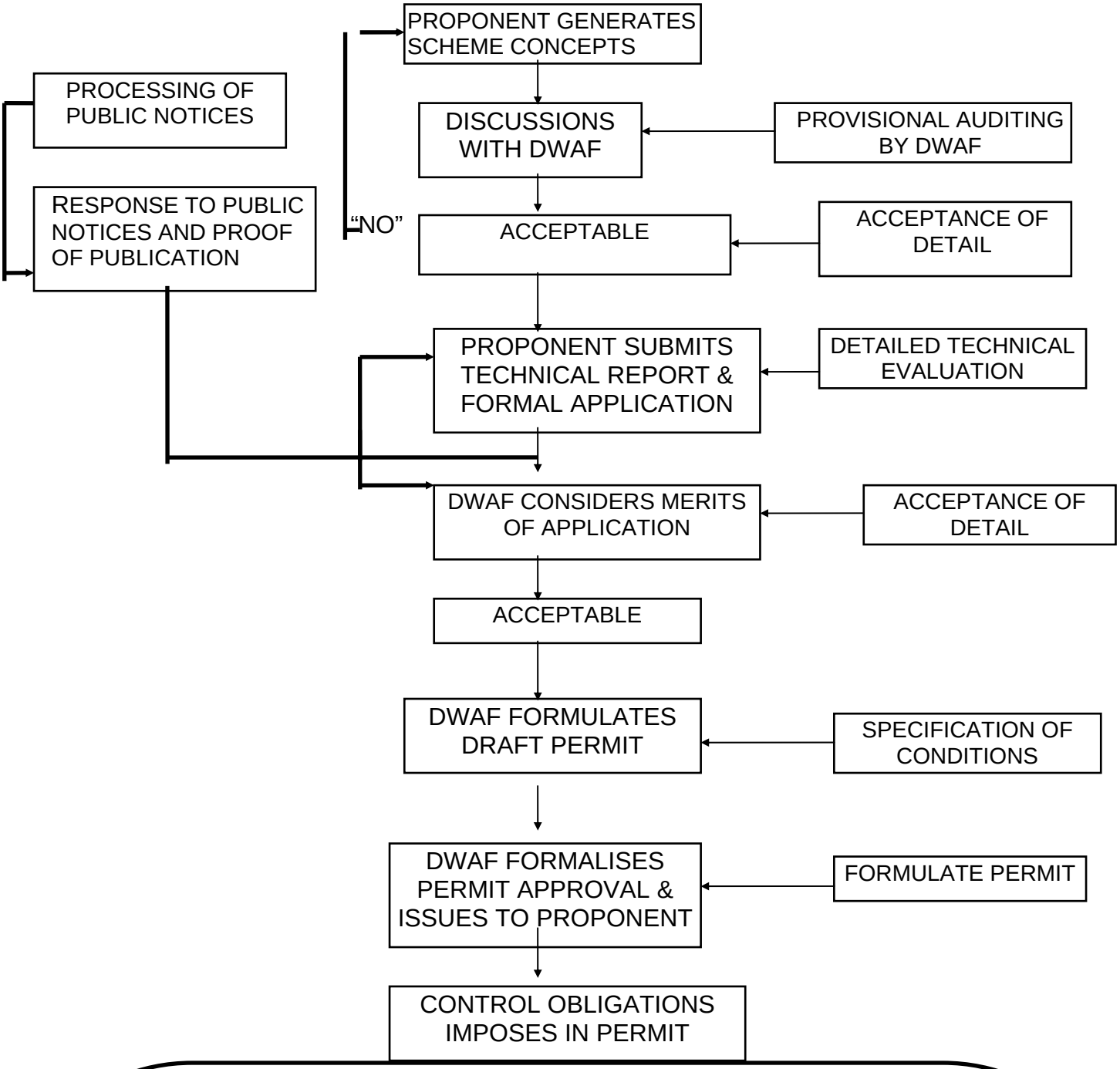
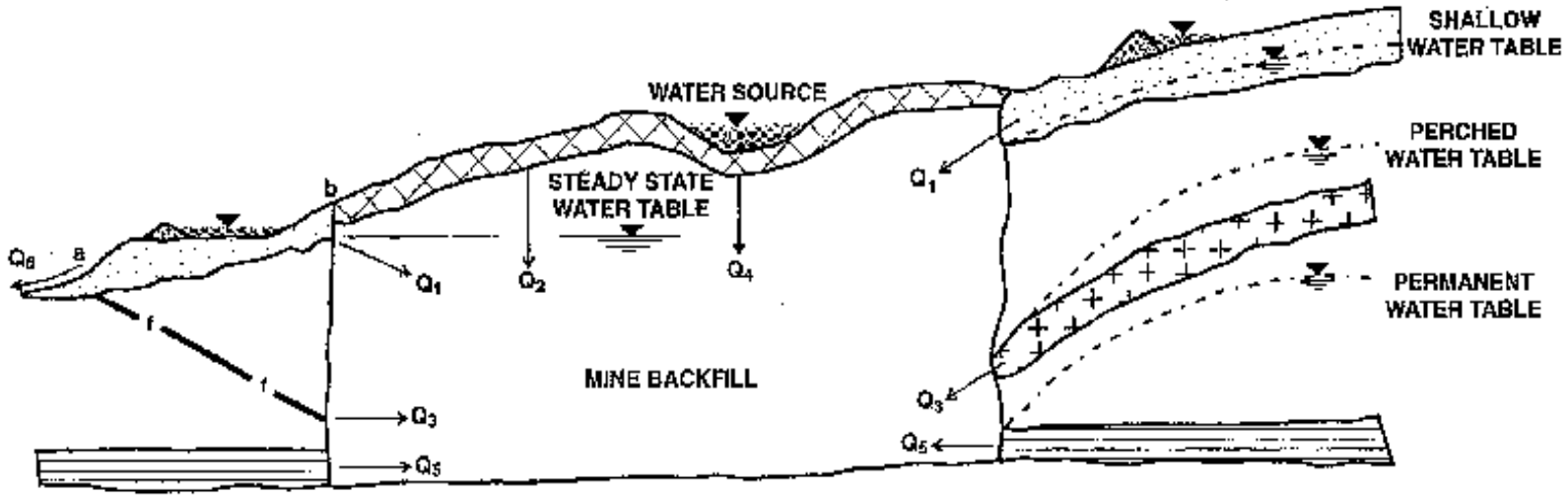


FIGURE 6 : ALTERATION OF PUBLIC STREAM : PERMIT PROCESS



LEGEND:

Q_1 = RECHARGE VIA SHALLOW WATER TABLE

Q_2 = RECHARGE THROUGH REHABILITATED SURFACE

Q_3 = SECONDARY AQUIFER RECHARGE

Q_4 = RECHARGE FROM WATER SOURCE OVER SPOILS

Q_5 = PRIMARY AQUIFER RECHARGE

Q_6 = DECANT (COULD OCCUR a OR b)

FIGURE 7 : GEOHYDROLOGICAL MODEL FOR REHABILITATED OPENCAST MINE

APPENDICES

APPENDIX 1

STANDARDISED DOCUMENTATION

In order to ensure a uniform approach by all Regional Directors to the permit process which is viewed outside the Department, the following standardised documentation has to be used:-

- a *proforma* permit which provides a number of conditions which should basically be included. Note that conditions regarding unique or rare technical exceptions to the norm, are not included. These must be compiled on a site-specific basis, in consultation with relevant specialists.
  a prescribed advertisement to announce the proposed alteration(s).

- a prescribed letter to all those who may be affected by the diversion.

PRO FORMA PERMIT TO ALTER THE COURSE OF A PUBLIC STREAM IN TERMS OF SECTION 20(1)(a) OF THE WATER ACT, 1956 (ACT NO 54 OF 1956)

(Where marked with [*], delete the word(s) not applicable)

REPUBLIC OF SOUTH AFRICA
Department of Water Affairs and Forestry

PERMIT TO ALTER THE COURSE OF [A*] PUBLIC STREAM[S*]
Section 20(1)(a) of the Water Act, 1956

Permit No. .....
Permit holder:.....

Office
Date stamp

By virtue of the powers delegated to me by the Minister of Water Affairs and Forestry by Government Notice No. .... of ..... in terms of section 165(1)(a) of the Water Act, 1956 (Act No. 54 of 1956), as amended, I, ..., in my capacity as Manager: Scientific Services in the Department of Water Affairs and Forestry, hereby in terms of section 20(1)(a) of the Water Act, 1956 and subject to the provisions of the Water Act, 1956, authorise (full name) ..... [identity/registration*] number ..... (hereinafter referred to as "the holder of the permit") of (postal address) .... to permanently alter the course of the public stream[s*] .... [and .....*] on portion ..... of the farm ..... [and portion ..... of the farm .....*] in the district ....., in the province ....., subjected to the following conditions:

1. The holder of the permit shall-

   1.1 carry out and complete all activities involved in the alteration to the course of the public stream[s*] concerned; and

   1.2 rehabilitate the original course of the public stream[s*] and area disturbed by carrying out the alteration as referred to in 1.1,

   according to the provisions, including the provisions dealing with the timetable, duration and sequence, of the report .....

Where applicable - this paragraph may be deleted if not required.

1

A technical report in a format prescribed by the Department should be submitted for technical evaluation. This report should be similar in form to an "Environmental Management Program Report" and should

..... [except for ....*] and the drawings No. ..... to No. ....., inclusive [, as well as the following requirements:

include the objectives with respect to water quality, stability and yield.

1.1.1 .....;

To be specified where applicable.

1.1.2 .....*].

2. A person approved by the Regional Director: ..... of the Department of Water Affairs and Forestry (hereinafter referred to as "the Regional Director") shall be responsible for ensuring that the activities have been carried out in accordance with 1 of these conditions. The request for approval shall be directed to:
   .....
   .....
   .....
   .....
   Tel .....

The Department's preference would be for a professionally qualified person.

3. Within 30 days after the completion of the activities referred to in 1 of these conditions according to the relevant provisions of this permit, the holder of the permit shall in writing under reference ..... inform the Regional Director thereof.

4. Until it has been demonstrated to the satisfaction of the Regional Director that the holder of the permit has complied with all the provisions stated herein the holder of the permit shall-

Maintenance is to include erosion damage repair, establishing vegetation, clearing silt etc. Should any of these be critical they should be specifically specified.

4.1 maintain-

4.1.1 the works necessary to alter the course of the public

stream[s*] concerned in such a condition; and

4.1.2 the rehabilitated original course of the public stream[s*] and area disturbed by carrying out the alteration as referred to in 1.1,

as to comply at all times with the provisions of 1 of these conditions;

4.2 [take samples ..../monitor the quality of the water in accordance with [...../the relevant provisions of the report referred to in 1 of these conditions*]];

It may be necessary to monitor other aspects such as erosion etc. In these special cases the exact extent of monitoring and objectives must be specified.

4.3 monitor the change in flow rate and quantity of water in accordance with [...../the relevant provisions of the report referred to in 1 of these conditions*];

Continuous monitoring would only be required under special ircumstances where for example significant watermake or loss is anticipated or where water suppply must be assured in schemes which combine storage with the diversion.

4.4 measure the ..... in accordance with [...../the relevant provisions relating to long term stability of the report

These should only be specified if considered to be necessary and critical to the performance of the diversion.

referred to in 1 of these conditions]; and

4.5 furnish the information of the [sample taking/ monitoring*] referred to in 4.2, 4.3 and 4.4 [..... to ..... in the following format: ...../ in accordance with [...../ the relevant provisions of the report referred to in 1 of these conditions*]].

5. If during the period of monitoring as prescribed in 4.2 of these conditions the [..... in/ quality of*] the water in the public stream[s*] concerned [is more than ...../fails to comply with [...../ the relevant provisions of the report referred to in 1 of these conditions*]], the holder of the permit shall take the necessary steps to ensure that the [..... in/quality of*] the water [is more than/does comply with the said [...../ report*]].

The report should prescribe fully what must be measured, where and when. Quantity objectives must be spelt out or left out completely.

6. If during the period of monitoring as prescribed in 4.3 of these conditions the flow rate or quantity of the water in the public stream[s*] concerned fails to comply with [...../the relevant provisions of the report referred to in 1 of these conditions], the holder of the permit shall take the necessary steps to ensure that the change in the flow rate or quantity of the water, as the case may be, does comply with the said [...../report*].

7. If the alteration to the public stream[s*] concerned can not be carried out and completed in accordance with the relevant provisions of this permit, the holder of

The provision is intended to make provision for the situation where unforeseen circumstances are encountered which make it impossible or impractical to complete the diversion in accordance with

the permit shall-

7.1 stop all the activities referred to in 1 of these conditions and take the steps necessary to prevent-

7.1.1 the possibility of pollution of any public or private water, including underground water, or sea water, or if the water has already been polluted, from being further polluted;

7.1.2 the possibility of changes to flow rate or quantity of water flowing in the public stream[s*]; and

7.1.3 the possibility of damaging of the environment, or if the environment has already been damaged, from being further damaged;

7.2 report the matter within 7 days to the Regional Director; and

7.3 submit to the Regional Director within an agreed time scale an alternative proposal to alter the course of the public stream[s*], to revert the stream[s*] to its previous course[s*] or to rehabilitate the area thus disturbed.

8. The Minister may at any time withdraw this permit or render the continued validity of the permit subject to such conditions as the Minister may then determine either by imposition of further or new conditions or by the withdrawal or amendment of conditions then existing.

This permit does not exempt the holder of the permit during the currency of this permit or thereafter from compliance with the provisions

the original scheme.

of any applicable act, ordinance, regulation or by-law.

In terms of section 20(5) of the Water Act, 1956 the attention of the holder of the permit is drawn to the provision of section 20(4) of the Water Act, 1956 that an objection against the issue of the permit or a matter in connection therewith may within 60 days as from the date of issue of the permit be lodged with a water court.

If the holder of the permit fails to comply with a condition of this permit or an order of a water court in terms of section 20(6) of the Water Act, 1956, he shall be guilty of an offence.

Signed at ....., this .... day of ..... 19 ....
.

MANAGER: SCIENTIFIC SERVICES
p.p. MINISTER OF WATER AFFAIRS AND FORESTRY

PRO FORMA NOTICE TO BE PLACED IN THE NEWSPAPER WHEN A PERSON INTENDS TO APPLY FOR A PERMIT TO ALTER THE COURSE OF A PUBLIC STREAM IN TERMS OF SECTION 20(1)(a) OF THE WATER ACT, 1956 (ACT NO 54 OF 1956)

NOTICE IN TERMS OF SECTION 20(2)(b) OF THE WATER ACT, 1956: INTENTION TO ALTER THE COURSE OF ..... AND* ..... ON THE FARM(S*) ..... AND* .....

(Where marked with an asterisk(*), delete words not applicable)

Notice is hereby given in term of section 20(2)(b) of the Water Act, 1956 (Act 54 of 1954), as amended, to all interested persons that .....identity/registration*number ..... of (address) ..... intends to apply for a permit in terms of section 20(1)(a) of the Water Act, 1956 for the permanent alteration of the course of the public stream(s*) known as ..... and ..... on portion ..... of the farm ..... and portion ..... of the farm .....*, in the district .....
After the proposed alteration of the course of the said public stream has been completed, the stream will be on portion ..... of the farm ..... and portion ..... of the farm .....* .

The purpose of the alteration is to
.....
.....

The applicant ..... intends to carry out and complete the alteration to the course of the public stream(*) concerned in accordance with the report ..... the drawing No. ..... to No. ....., inclusive, and good acceptable engineering practices.

Interested persons may inspect the report and drawings concerned at:

.....
.....
Tel .....
Contact person .....

Interested persons are called upon to submit before .....199 .. under reference ..... to the Director-General of the Department of Water Affairs and Forestry in writing any objections against the proposed application of the applicant ..... for a permit in terms of section 20(1)(a) of the Water Act, 1956. The address is:

The Director-General
Department of Water Affairs and Forestry
Private Bag X313
0001 Pretoria
For attention ..... (Name of responsible head office official)

PRO FORMA KENNISGEWING OM IN DIE NUUSBLAD TE PLAAS WANNEER 'N PERSOON VAN VOORNEME IS OM AANSOEK TE DOEN OM DIE LOOP VAN 'N OPENBARE STROOM TE VERANDER IN GEVOLGE ARTIKEL 20(1)(a) VAN DIE WATERWET, 1956 (WET NO 54 VAN 1956)

KENNISGEWING IN GEVOLGE ARTIKEL 20(2)(b) VAN DIE WATERWET, 1956: VOORNEME OM DIE LOOP VAN ..... EN* ..... OP DIE PLAAS/PLASE* ..... EN* ..... TE VERANDER

(Waar gemerk met 'n asterisk(*), skrap die woorde nie van toepassing nie)

Kennis word hiermee gegee ingevolge artikel 20(2)(b) van die Waterwet, 1956 (Wet 54 van 1954), soos gewysig, aan alle belanghebbende persone dat ..... identiteits-/registrasie-*nommer ..... van (adres) .....
van voorneme is om aansoek te doen om 'n permit in gevolge artikel 20(1)(a) van die Waterwet, 1956 vir die permanente verandering van die loop van die openbare stroom/strome* bekend as ..... en ..... op gedeelte ..... van die plaas ..... en gedeelte ..... van die plaas .....(*), in die distrik ..... .

Nadat die voorgestelde verandering van die loop van die openbare stroom ..... voltooi is, sal die stroom op gedeelte ..... van die plaas ..... en gedeelte ..... van die plaas .....(*) wees.

Die doel van die verandering is om ....

Belanghebbende persone kan detail ten opsigte van die skema hoe die applikant (naam) ..... beoog om die verandering aan die loop van die openbare stroom/strome* betrokke uit te voer en te voltooi, besigtig by:

.....
.....
.....
Tel .....
Kontak persoon .....

Indien 'n belanghebbende persoon enige besware teen die voorgestelde aansoek om 'n permit in gevolge artikel 20(1)(a) van die Waterwet, 1956 van die applikant (naam) ..... het, word hy versoek om die besware skriftelik voor .... 199.. onder verwysing ..... aan die Direkteur-generaal van die Departement van Waterwese en Bosbou voor te lê. Die adres is:

Direkteur-generaal
Departement van Waterwese en Bosbou
Privaatsak X313
0001 PRETORIA
Vir aandag: ..... [Naam van verantwoordelike hoofkantoor beampte]

PRO FORMA NOTICE TO BE GIVEN TO CERTAIN PERSONS WHEN A PERSON INTENDS TO APPLY FOR A PERMIT TO ALTER THE COURSE OF A PUBLIC STREAM IN TERMS OF SECTION 20(1)(a) OF THE WATER ACT, 1956 (ACT NO 54 OF 1956)

(Where marked with an asterisk(*), delete words not applicable)

Address of person intending to apply for the pemit
Date

Address of person in control of land adjoining the
land on which the alteration is contemplated

Dear Sir

NOTICE IN TERMS OF SECTION 20(2)(a) OF THE WATER ACT, 1956: INTENTION TO ALTER THE COURSE OF ..... AND* ..... ON THE FARM(S*) ..... AND* .....

Notice is hereby given in terms of section 20(2)(a) of the Water Act, 1956 (Act 54 of 1954), as amended, to you as the person in control of portion ..... of the farm ..... that (name) ..... identity/registration*number ..... of (address) .... intends to apply for a permit in terms of section 20(1)(a) of the Water Act, 1956 for the permanent alteration of the course of the public stream(s*) known as ..... and ..... on portion ..... of the farm ..... and portion ..... of the farm .....*, in the district ..... After the proposed alteration of the course of the public stream has been completed, the stream will be on portion ..... of the farm ..... and portion ..... of the farm .....* .

The purpose of the alteration is to ....

The applicant ..... intends to carry out and complete the alteration to the course of the public stream(s*) concerned in accordance with the report ..... the drawings No. ..... to No. ....., inclusive, and good acceptable engineering practices.

You may inspect the report and drawings concerned at: ....
Tel: .....
Contact Person: .....

You are called upon to submit before ..... 199 .. under reference ..... to the Director-General of the Department of Water Affairs and Forestry in writing any objections against the proposed application of the applicant ..... for a permit in terms of section 20(1)(a) of the Water Act, 1956. The address is:

Director General
Department of Water Affairs and Forestry
Private Bag X313
0001 PRETORIA

For attention: ..... (Name of responsible head office official)

Yours faithfully

NAME OF PERSON INTENDING TO APPLY FOR THE PERMIT

PRO FORMA KENNISGEWING AAN SEKERE PERSONE WANNEER 'N PERSOON VAN VOORNEME IS OM AANSOEK TE DOEN OM DIE LOOP VAN 'N OPENBARE STROOM TE VERANDER IN GEVOLGE ARTIKEL 20(1)(a) VAN DIE WATERWET, 1956 (WET NO 54 VAN 1956)

(Waar gemerk met 'n asterisk(*), skrap die woorde nie van toepassing nie)

Adres van persoon wat van voorneme is om vir 'n permit aansoek te doen
Datum

Adres van persoon in beheer
van grond wat grens aan die
grond waarop die verandering
beoog word

Waarde Heer

KENNISGEWING IN GEVOLGE ARTIKEL 20(2)(a) VAN DIE WATERWET, 1956: VOORNEME OM DIE LOOP VAN ..... EN* ..... OP DIE PLAAS/PLASE* ..... EN* ..... TE VERANDER

Kennis word hierby gegee ingevolge artikel 20(2)(a) van die Waterwet, 1956 (Wet 54 van 1954), soos gewysig, aan u as die persoon in beheer van gedeelte .... van die plaas .... dat (naam) ..... identiteits-/registrasie-*nommer ..... van (adres) .....
van voorneme is om aansoek te doen om 'n permit in gevolge artikel 20(1)(a) van die Waterwet, 1956 vir die permanente verandering van die loop van die openbare stroom/strome* bekend as ..... en ..... op gedeelte ..... van die plaas ..... en gedeelte ..... van die plaas .....(*), in die distrik ..... .

Nadat die voorgestelde verandering van die loop van die openbare stroom ..... voltooi is, sal die stroom op gedeelte ..... van die plaas ..... en gedeelte ..... van die plaas .....(*) wees.

Die doel van die verandering is om ..... .

Belanghebbende persone kan detail ten opsigte van die skema hoe die applikant (naam) ..... beoog om die verandering aan die loop van die openbare stroom/strome* betrokke uit te voer en te voltooi, besigtig by:

.....
.....
.....
Tel .....
Kontak persoon .....

Indien u enige besware teen die voorgestelde aansoek om 'n permit in gevolge artikel 20(1)(a) van die Waterwet, 1956 van die applikant (naam) ..... het, word u versoek om die besware skriftelik voor .... 199.. onder verwysing ..... aan die Direkteur-generaal van die Departement van Waterwese en Bosbou voor te lê. Die adres is:

Direkteur-generaal
Departement van Waterwese en Bosbou
Privaatsak X313
0001 PRETORIA
Vir aandag: ..... [Naam van verantwoordelike hoofkantoor beampte]

Die uwe

NAAM VAN PERSOON WAT VAN VOORNEME
IS OM AANSOEK TE DOEN OM 'N PERMIT

APPENDIX 2

REQUIREMENTS OF TECHNICAL REPORT

The technical report contains the essential information on which the evaluation of the alteration of a stream as required in section 9 is based. In this respect, a technical report should contain at least the following:-

- motivation
- general information
- legal requirements
- performance objectives
- baseline information
- impact assessments
- impact management measures
- monitoring provision
- financial provision.

Along with the above, the following should be included:

- design drawings
- design criteria
- flood hydrology
- expected hydraulic conditions

- **Motivation**

  As every effort must be made to avoid an allocation of a stream, an application must be properly motivated in terms of economic, social or environmental grounds before it will be considered.

- **General Information**

  - name, address and telephone number of proponent
  - name and address of the owner of the land
  - location
  - description of proposed project.

- **Legal requirements**
  - proof that the requirement of Section 20 (2) (a) and (b) have been complied with
  - copies of the notices must be included
  - objections in terms of Section 20(2)(a) and (b)
  - how are objections to be addressed.

- **The performance objectives**

  These objectives should be clearly defined in terms of:-

  - water quality
  - catchment yield and hydrology
  - protection and reinstatement of a healthy natural aquatic environment
  - sustainability and stability impact management measures.

  The objectives must be stated in a clear and unambiguous manner and they must be measurable.

- **Baseline information**

  Sufficient baseline information must be submitted with the application to substantiate the impact assessment and facilitate an informed assessment of the suitability or otherwise of the proposed impact management measures, of the requirements for monitoring and for the evaluation of residual risks. In more detail these include:-

  - geology, i.e, stratigraphy and presence of dykes, sills and faults.
  - climate, i.e, rainfall, evaporation, temperatures and rainfall intensities.
  - topography, i.e, surface contours at appropriate intervals.
  - surface water
    - surface water quantity
      - dry weather flow
        - flood peaks and volumes for recurrence intervals of 1:20, 1:50 and 1:100 years and the regional maximum flood
        - the mean annual run-off entering upstream of the proposed alteration

    - surface water quality
    - surface water use

- groundwater
  - depth of ground water level
  - groundwater quality
  - groundwater use
  - an estimate of the contribution of the stream to groundwater recharge and an estimate of groundwater to surface water over the diverted section
- alternatives to the alteration of the stream.

- **Impact assessment**

  Impacts should be quantified and substantiated by supporting information where necessary. The level of resolution required should be determined on the basis of significance of the impacts and the risk associated with each impact and the requirement for decision-making as stated in Section 9.

- **Impact management measures**

  Impact management measures should be described in sufficient detail to facilitate evaluation of the suitability of the proposed measures for their intended purpose. This would include design and related details pertaining to:-

  - topographical plans covering the original alignment, the new alignment and sufficient of the areas upstream and downstream of the proposed alteration so as to extend beyond the area of influence of the alteration
  - plans, cross-sections and long-sections showing the full scheme and nearby infrastructure
  - details of the linings, armouring or erosion control measures
  - details of hydraulic structures forming part of the alteration
  - details of the beginning and end of the alteration showing the transition to the original natural water course
  - details of points where storm water is expected to enter the alteration and the associated erosion control measures
  - detailed description, including plans at the same level of details as for the final alteration of any intermediate or temporary steps which may be necessary to achieve the final aim
  - measures for maintaining the long-term alignment (such as may be required where an alteration is located on unstable ground)

  - stratigraphic sections and engineering properties of the materials through which the alteration is to be constructed

- flood-lines for recurrence intervals of 1:20, 1:50, 1:100 years and the regional maximum flood for both the pre-alteration and post-alteration situation

Furthermore, the proponent is required to demonstrate the sustainability of the proposed mitigation measures. In particular the following must be demonstrated:-

- the proposed measures shall not be extensively damaged by floods exceeding the magnitude of the designed flood capacity
- the proposed measures shall be of a permanent nature and shall adequately resist failure and retain structural integrity over an adequate period of time (or indefinitely)
- the proposed measures shall not require ongoing maintenance and service - if this is not possible, then the proponent must demonstrate adequate financial provision.

Moreover, impact management measures must be described in sufficient detail to fulfil the decision-making requirement as stated in Section 9.

- **Monitoring provision**

The monitoring system should describe the nature of the data to be collected, the points of measurement or observation and frequency. Details regarding the nature and construction of monitoring points and equipment should be submitted to facilitate an evaluation of the suitability of proposals.

- **Financial provision**

In those instances where management measures are not self- sustaining or where there is risk that the management measures may not work, financial provisions must be made to cover the implementation of effective self-sustaining measures.

APPENDIX 3

EXAMPLE WITH RESPECT TO STIPULATION OF OBJECTIVES/REQUIREMENTS

This appendix includes examples with respect to the stipulation of objectives/requirements for:-

- sustainability of impact management measures
- water quality compliance requirements
- water quality monitoring requirements

- **Sustainability of measures**

  In order to satisfy the Department that the measures implemented are sustainable the permit holder must demonstrate that:-

  - the proposed measures shall not be damaged by erosion or scour normal hydrological events and these measures shall be designed to cope with flood events of at least 1:100 year recurrence interval
  - the proposed measures shall not be damaged excessively by floods exceeding the magnitude of floods occurring on average once in every 100 years
  - the proposed measures shall be of a permanent nature and shall adequately resist failure, retain structural integrity and serviceability for a minimum period of 20 years.

A qualitative evaluation of the measures by a recognised specialist will be acceptable. A report on the evaluation shall be submitted on an annual basis for a minimum period of two years, or untill it has been proven that the measures implemented are sustainable.

- **Water quality compliance requirements**

TABLE 1: Water quality compliance requirements

Water quality variable	Units	Maximum allowable	95 percentile	50 percentile
pH	-	-	6.5-9.0	-
Total dissolved salts (TDS)	mg/l	630	404	207
Sulphate ($S0_4$)	mg/l	425	265	125
Sodium absorption rate (SAR)	$(mmol/l)_{0.5}$	10	5	3
Aluminium (Al)	mg/l	**	**	**
Iron (Fe)	mg/l	**	**	**
Manganese (Mn)	mg/l	**	**	**

Note: A statistical protocol must be included to ensure that the compliance assessment can be evaluated consistently.

- **Water quality monitoring requirements**

The following upstream and downstream locations in a particular river shall be sampled on a fortnightly basis (26 samples per annum):-

- upstream alteration
- downstream of alteration (Note: Specify location as fully as possible)

The collected samples shall be analysed for the following:-

- pH
- conductivity
- total dissolved salts (TDS)
- sulphate, chloride, alkalinity
- calcium, magnesium, sodium
- aluminium, iron and manganese.

Standard SABS methods shall be used for all sample analyses. All analyses (except pH) shall be conducted on filtered (0.45) samples. Samples shall be handled and preserved in accordance with procedures set out in Standard Methods. Samples for iron, manganese and aluminium shall not be preserved, but be conveyed to the laboratory as soon as possible. The laboratory shall be clearly instructed to analyse separately for both the total acid soluble and dissolved fractions of these three metals.

APPENDIX 4

SECTION 20
OF THE
WATER ACT, 1956 (ACT 54 OF 1956)

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20. Alteration in the course of a public stream. -(1) *(a)* Except under authority of a permit issued by the Minister and in accordance with any condition subject to which such permit was issued, no person shall alter the course of a public stream.

(b) Paragraph *a)* shall not apply in a case where the course of a public stream is altered-

(I) in accordance with an order of a water court under subsection (9);

(ii) by or on the authority of an irrigation board under section 89 (1) (e);

(iii) by a local authority within its area of jurisdiction;

(iv) by the construction of a soil conservation work in terms of the Conservation of Agricultural Resources Act, 1983 (Act No. 43 of 1983).

(2) Any person intending to apply for a permit referred to in subsection (1) (a) shall at least 30 days before lodging his application-

(a) give notice in writing of his intention to every person in control of land adjoining the land on which such alteration is complicated;

(b) on two occasions in successive weeks give notice of his intention to other interested persons in an Afrikaans and in an English newspaper circulating in the area in which such an alteration is contemplated;

and call upon them to submit to the Director-General in writing any objections against the proposed application within a specified period, which shall not be less than 30 days as from the date on which the relevant notice was thus given.

(3) An application for a permit referred for a permit referred to in subsection (1) (a) and a notice referred to in subsection (2) shall be in such form and include such particulars as may be prescribed by regulation under section 26.

(4) If the Minister grants an application for a permit referred to in subsection (1) (a), the Director-General shall, within 14 days after the permit has been issued to the applicant, send a copy thereof to each person who within the period specified in the notice submitted written objections against the application to the Director-General, and thereupon such a person, provided he is entitled to the use of water in the relevant public stream, is likely to be prejudiced in the exercise of his right by the proposed alteration in the course thereof and has given notice in writing of his intention to the Minister and the holder of the permit, may not later than 60 days as from the date on which the permit was issued, lodge an objection with a water court against the issue of the permit or matter in connection therewith.

(5) A permit referred to in subsection (1) (a) shall include a notice drawing attention to the provisions of subsection (4) that an objection against the issue of the permit or a matter in connection therewith may within 60 days as from the date of issue to the permit be lodged with a water court.

(6) (a) A water court with which an objection has been lodged in terms of subsection (4) may confirm or set aside the permit in question, or cancel or vary any condition to which it is subject, or substitute for any such condition, or add, a new condition, or make such order in connection with such permit as it may deem fit.

(b) Any conditions amended, substituted for other conditions or added by a water court under paragraph (a) shall for the purposes of subjection (1) be deemed to be conditions subject to which permit concerned has been issued.

(7) If a permit is set aside by a water court under subsection (6) the steps being taken to alter the course of the public stream in pursuance of such permit shall be discontinued, and if the course of the stream has already been altered, the person to whom the permit was issued shall, within such period as may be determined by the court, take such steps as are necessary to revert the stream to its previous course or as the court may order in the particular circumstances.

(8) If any alteration in the course of a public stream has occurred through natural causes or been effected in an artificial manner-

(a) such alteration shall not affect any existing right or any right conferred by section 9 or 10 with respect to that stream or the water thereof and in force immediately prior to such alteration;

(b) such alteration shall not give rise to the creation of any new rights to the stream or the water thereof;

(c) any land which prior to such alteration was not riparian to such stream and which in consequence of that alteration became riparian to that stream, shall for the purposes of this Act be deemed not to be riparian to that stream;

(d) such alteration shall not bring about any change in the boundary between two pieces of land where such stream, prior to the alteration in the course thereof, constituted the boundary or part of the boundary between those pieces of land.

(9) At any time within five years after an alteration in the course of a public stream occurred through natural causes, any person entitled to the use of water from that stream is impeded in any other manner in the exercise of his right, may apply to a water court for an order authorising him to construct such works which in the opinion of the court are necessary to revert the stream to its previous course.

(10) (a) The Minister may-

(I) by notice in writing to a person exempt that person; or

(ii) by notice in the Gazette exempt a person belonging to a category of persons, from any of all the provisions of subsections (1), (2) and (3) on such conditions as may be specified in the notice.

(b) The Minister may at any time-

(I) in the case of an exemption granted under paragraph (a) (I), by notice in writing to the person concerned; or
(ii) in the case of an exemption granted under paragraph (a) (ii), by notice in the Gazette,
withdraw such exemption or render the continued validity of the exemption subject to such conditions as the Minister may the determine either by the imposition of further or new conditions or cancellation or amendment of conditions then existing.

(11) Any person who contravenes or fails to comply with a provision of this section or a condition of a permit of an exemption or an order of a water court issued thereunder, shall be guilty of an offence.

[S. 20 substituted by s. 10 of Act No. 96 of 1984.]

21. Purification and disposal of water used for industrial purposes and effluent.-
(1) Any person using for industrial purposes water, including sea water brought ashore, shall-

(a) purify or otherwise treat the water used and any effluent produced by or resulting from such use, in accordance with such requirements as the Minister may from time to time, after consultation with the South African Bureau of Standards mentioned in the Standards Act, 1982 (Act No. 30 of 1982), prescribe by notice in the Gazette generally or in relation to water used for any particular industrial purpose, or in relation to water or effluent to be disposed of by discharging it into any particular public stream or in to the sea, or in relation to water or effluent to be disposed of in any particular area;

(b) after he has complied with paragraph (a) discharge the purified or treated water, including water recovered from any effluent, in a manner and subject to any such requirements as may be prescribed by regulation under section 26-

(I) if the water so used was derived from a public stream, into that public stream at the place where such water was abstracted from the stream or at such other place as the Minister may indicate;

(ii)if the water so used was sea water, into the sea at the place where such water was abstracted from the sea or at such other place as the Minister may indicate;

(c) furnish the Director-General in writing with such particulars regarding use and the disposal of the purified or treated water, including water recovered from any effluent, as may be prescribed by regulation under section 26.